

**EFFECT OF MASTERY LEARNING  
STRATEGY (MLS) ON PUPIL  
ACHIEVEMENT**

**R. C. HOODA**

**DEPARTMENT OF EDUCATION  
DEVI AHILYA VISHWAVIDYALAYA  
INDORE  
1983**



## F O R E W O R D

Mastery Learning offers a powerful new approach to student learning in classroom which can provide almost all students with the successful and rewarding learning experiences now provided to only a few. It proposes that all or almost all students can master what they are taught in the classroom. Further, it suggests procedures where each student's instruction and classroom learning can be so managed, within the context of group-based classroom instruction, as to promote his fullest development. Mastery learning enables 80 to 90 percent of the students to learn 80 to 90 percent of the instructional content under group-based instructional methods. It also makes student learning more efficient than conventional approaches. Mastery learning also produces markedly greater student interest in and attitude towards the subject learned than usual classroom methods.

The present study on 'The Effect of Mastery Learning Strategy (MLS) on Pupil Achievement' reported here, an ERIC financed project, is an attempt to operationalize mastery learning strategy. The study has been conducted by Dr. R.C. Hooda in the Department of Education, Devi Ahilya Vishwavidyalaya, Indore. The study provides empirical evidence to the effect that it is possible to improve student's achievement through mastery learning strategy. The mastery learning strategy comprised the steps, namely, development of



teaching units and unit tests, orienting for mastery, teaching a unit, formative evaluation, making renewed efforts, re-evaluation, organising tutorial services, and teaching the next unit. I hope that this research report will be of interest to teachers, teacher educators and research workers in this area.

(B.K. PASSI)  
Professor and Head,  
Department of Education,  
Devi Ahilya Vishwavidyalaya,  
Indore.



## P R E F A C E

Teacher Behaviour and Instructional Technology are probably the most popular and publicised areas of research in education today. Every research gives support to the fact that the type of instruction being provided in our schools is definitely of a low quality, ultimately affecting the extent of learning of the students. One of the most powerful ideas beginning to shape educational views and practices is mastery learning. It assumes that all, or almost all, students can learn well and suggests explicit classroom procedures whereby all (upto 95 percent) can achieve to high levels. Few recent ideas have produced more dramatic positive effect on student learning or generated more interest in school based research than mastery learning.

The present study was conducted to find out the effectiveness of Mastery Learning Strategy related to mathematics teaching for grade VI. A conclusion coming out of this study indicates that it is possible to improve achievement level of pupils in mathematics through the Mastery Learning approach. So far, mastery learning has been found to <sup>be</sup> effective in developing the cognitive and affective domains of student's abilities, but the results of the present study indicates that the different





dimensions of students verbal and nonverbal creativity are also improved by the strategy of mastery learning.

I feel grateful to Prof. R.C. Das, Head, Department of Teacher Education, and Dr. N.K. Jangira, Reader, NCERT, New Delhi, for their consistent encouragement, genuine interest and technical assistance throughout, making the work more challenging and lively. I am thankful to Dr. B.K. Passi, Professor and Head, Department of Education, Devi Ahilya Vishwavidyalaya, Indore, for his interest in this work from its very inception, and guided it upto its completion. I wish to thank Dr. H.R. Pal, for devoting his precious time during the preparation of this document.

I am thankful to the Educational Research and Innovation Committee (ERIC), NCERT, New Delhi for financing the project. It is always difficult to find educational institutions for experimental work. This difficulty was, however, overcome with ease through cooperation from Prof. B.K. Passi and Shri S.S. Sharma, The District Education Officer, Indore. I am particularly thankful to Shri Badri Narayan, Mathematics Teacher, for his devotion and dedication in conducting the experiment. I owe my gratitude to the students who participated in the study.

(R.C. HOODA)  
Lecturer  
Department of Education,  
Devi Ahilya Vishwavidyalaya, Indore.



## C O N T E N T S

	FOREWORD	Page No.°
	PRE FACE	
CHAPTER-I	INTRODUCTION	1-14
	1.0.0 THE BACKDROP	1
	1.1.0 NEED OF MASTERY LEARNING IN INDIAN CONTEXT	4
	1.2.0 CONCEPT OF MASTERY LEARNING	6
	1.3.0 PRE-CONDITIONS FOR MASTERY LEARNING	7
	1.4.0 BACKGROUND OF THE PROBLEM	9
	1.5.0 STATEMENT OF THE PROBLEM	11
	1.5.1 OBJECTIVES	
	1.5.2 HYPOTHESES	12
	1.5.3 LIMITATIONS	14
CHAPTER-II	DESIGN AND PROCEDURE	15-24
	2.0.0 DESIGN	15
	2.1.0 SAMPLE	17
	2.2.0 TOOLS	18
	2.3.0 EXPERIMENTAL PROCEDURE	18
	2.4.0 STATISTICAL ANALYSIS	24



CHAPTER-III	RESULTS, INTERPRETATION AND DISCUSSION	25-49
3.0.0	INTRODUCTION	25
3.1.0	EFFECT OF MLS ON ACHIEVEMENT OF PUPILS	26
3.2.0	EFFECT OF MLS ON PUPIL'S ACHIEVEMENT	28
3.3.0	EFFECT OF MLS ON SELF-CONCEPT OF PUPILS	32
3.4.0	EFFECT OF MLS ON ATTITUDE TOWARDS MATHEMATICS	35
3.5.0	EFFECT OF MLS ON DIFFERENT DIMENSIONS OF NONVERBAL CREATIVITY	38
3.6.0	EFFECT OF MLS ON DIFFERENT DIMENSIONS OF VERBAL CREATIVITY	44
CHAPTER-IV	CONCLUSIONS AND IMPLICATIONS	50-57
4.0.0	INTRODUCTION	50
4.1.0	CONCLUSIONS	50
4.2.0	EDUCATIONAL IMPLICATIONS	53
	APPENDIX	1-45
A-	SUMMATIVE TEST	1-14
B-	UNIT TEST	15-41
C-	ATTITUDE SCALE	41-45



CHAPTER - I  
INTRODUCTION

1.0.0 THE BACKDROP

In our society, education to an individual is provided by many institutions such as home. Church, mass media and by varied experiences of life within a society. But through out the world, schools have been entrusted with the responsibility of providing a major part of education for the young. While the purposes and content of this education vary greatly between and within

nations, the process of schooling is much the same everywhere. Schools are organised in which teachers and instructional materials provide instruction to groups of students. Usually each group has students between twenty and seventy. Much of the instruction for learning is intended to be systematic for every year or term. Societies in the past have relied largely on selection of talent as means for securing a small group of well educated persons. Modern societies, which need a large number of people with particular talents cannot depend purely on selection methods for finding such talents. They attempt to produce this by legal and social pressures which requires individual to attend school for a minimum of ten to twelve years. A society which places such great value on schooling that it requires the individual to attend school for long period of time must find the means to make schooling attractive and meaningful to the individual learner .





Children are believed to be normally distributed with respect to their attributes like intelligence, aptitude and personality traits. Similarly, it is also believed that pupils are normally distributed with respect to their achievement in any field of learning. In the present system of education, academic goals for teachers and students appear to be predetermined. It reduces teacher's aspirations and pupils desires for further learning. Further, it systematically destroys the ego and self-concept of a sizeable proportion of students who are legally required to attend school for eight years under conditions which are systematically frustrating and humiliating. It results in development of negative self-concept and attitude in child's life. Besides, it exposes the enormous wastage of resources invested in education.

Today education is one of the vast enterprises in terms of persons involved and resources expended in the process. The concern for accountability is growing with the corresponding growth in the consciousness of taxpayers who are not satisfied with the increase in enrolment ratio alone. They are now more and more concerned with actual achievement of their children. Probably, high level of competition for admission to professional institutions, higher education and shrinking employment



opportunities are responsible for this growing concern alongwith other educational and cost factors . Moreover, millions of children go to school for their education. Each one of them spends nearly 15,000 to 20,000 hours in our classrooms and nearly 5000 to 10,000 hours we demand from him for school related tasks at home.

Despite great advances in knowledge about student learning and the investment of tremendous amounts of time, effort, and money, our schools still have not moved very far toward the goal of increased learning for all students. Present policies and practices continue to reproduce the same normal achievement distribution in the learning of classroom. During the past decade or so, there has been much concern about ways in which curriculum and instruction could be improved. Crowford and others (1972) found that some new curricula and instructional strategies result in superior learning by students as compared with more conventional approaches. Closely related to the work on the development of new approaches to curriculum and instruction is the recent work on mastery learning. This approach makes use of the existing curricula but seeks teaching procedures and a set of feedback and correction techniques to ensure a high level of learning by majority of students. The basic idea that most students can learn what the schools have to teach if the problem is approached sensitively and systematically is an



old one. Before the 17th century by Comenius, in 18th century by Pestalozzi and in 19th century by Herbart, in 20th century Washburne (1922) and his winnetka plan and Morrison (1926) at the university of Chicago Laboratory school and Carroll's model of school learning (1963), provide the basis for optimising pupil's learning in different curricular areas. Carroll's model of school learning provides viable explanation of the variation in achievement of the learners and pointed to the input variables including quality of instruction for improving the same (Carroll, 1963); Bloom's mastery learning approach demonstrated that classes suffer from underachievement and through appropriate teaching strategies practically all students can be helped to achieve the desired mastery level (Bloom, 1971; Block 1971, 1974).

#### 1.1.0 Need of Mastery Learning in Indian Context

The mastery learning ideas and practices can be obviously made use of in the Indian classroom. In India, the public confidence in the teaching profession is very low. In order to regain the lost public confidence, the Indian teacher can make use of mastery learning for talent development. This strategy is based on no technology except the technology of developing instructional materials (Textual, formative evaluation and summative evaluation) and indigenous organisational models for providing



alternative instructional channels within our existing school and class structure. In this approach the prescribed curriculum can be dealt within a fixed period of time. This approach relies primarily on human beings for their success rather than on machines and technological devices which a developing country like ours, can hardly afford. In this approach the teacher decides what goes on in the classroom and when a particular activity will be taken in the <sup>class</sup> /room. The teacher is free to use his own instructional techniques and materials, which suit the needs of his students. The student is also free to guide his learning and also help others in learning. The groupbased/teacher-paced mastery learning strategy, can be implemented with minor structural changes in our school and classroom organisation.

Besides this, the dropout rate at the primary level in India is staggering, despite the use of a number of measures in the form of incentives to the pupils. The dropout rate continues to be consistently high. (In such a situation the realisation of the Indian constitutional objective concerning 'universalisation of elementary education will remain far from reality. It is time to think beyond mere incentives as a means of universalisation. The problem, to a large extent, is also caused by the quality of instruction in our primary schools.





The problem of dropout of children is likely to be tackled through ensuring quality of instruction and corresponding achievement on the part of the learner. Unless it is ensured that each pupil in the beginning grade learns all the core concepts and skills of instruction in the area of literacy and numeracy, his subsequent learning potential will remain fragile. He will be on the brink, always ready to give up schooling at the slightest pretext.

The situation outlined above makes it important for us in India to develop a strategy to ensure learning of the total instruction by all pupils. In other words, we need mastery learning strategy to be followed by the teachers of Indian schools.

#### 1.2.0 Concept of Mastery Learning :

There are many versions of mastery learning in existence at present, but all begin with the notion that virtually all students can master all that is taught in the classroom. Bloom (1976) writes that this can be achieved if :

- (a) instruction is approached sensitively and systematically.
- (b) students are helped when and where they have learning difficulties.
- (c) they are given sufficient time to achieve mastery.



- (d) there is some clear criterion of what constitutes mastery.

Bloom (1971) maintains that 95% of the instructional content can be mastered by 95% of the pupils through different strategies of mastery learning. Maintenance of 95% of mastery level produces maximum cognitive learning, but may affect adversely attitudes and interests of the learners. However, 95% mastery level offsets these adverse affects (Block 1970). The strategy has been found to be effective even with classes with teacher-pupil ratio of 1:70 (Hogwon, 1969). The mastery learning strategies are mainly of two types (i) group-based/teacher-paced type as that of Bloom, Block and Anderson, where students learn co-operatively with their classmates and (ii) individually-based/student-paced type, where students learn independently of their classmates, as that of Keller's and Sherman's.

#### 1.3.0 Pre-conditions for Mastery Learning:

The teacher who wishes to use the mastery learning approach has to make the following preplanning before moving to the classroom.



The teacher has to decide the learning level (mastery level). This may indicate the percentage of students learning the percentage of content taught to them. It may be decided from 80% to 100% of learning by 80% to 100% of students.

#### 1.3.2 Summative Evaluation :

The teacher after deciding the content and mastery level, would prepare a summative test. Then he would fix the score for attainment of mastery level on this test. The students who attain the fixed score and above, would be graded "masters" and others would be graded "nonmasters".

#### 1.3.3 Development of Sequential units:

The content decided is divided into convenient teaching units. The teacher sequences these units. The science and mathematics teachers have tended to sequence their units linearly, so that the material in each unit transfer directly to the next unit. Teachers of arts, humanities and social sciences however, have tended to sequence their units hierarchically, so that the material in each unit transfers but not necessarily to the next unit. It may transfer to a subsequent unit.



#### 1.3.4 Formative-evaluation :

The teacher develops unit tests for each of the teaching units. These will be diagnostic in nature and will be good source of feed-back to both teachers and students. These will be administered after completion of each teaching unit. All kinds of deficiencies in student learning and teacher's teaching are found out with the help of these tests. The teacher specifies a score on each formative test which, when attained, will be indicative of the unit mastery.

#### 1.3.5 Correctives :

The teacher develops a set of alternative instructional materials or correctives keyed to each item on each unit formative test. These correctives may consist of co-operative small group study sessions, individual tutoring by the teacher and by classmates who achieved mastery in the unit, learning aids such as different textbooks, workbooks, audio-visual materials, academic games/puzzles, home work, quizzes, etc.

#### 1.4.0 BACKGROUND OF THE PROBLEM :

The concept of mastery learning is a continuing topic of investigation in education and psychology. A stream of publications has emanated from the works of Corroll (1963), Bloom (1968), and Keller (1968). A





growing body of evidence (McKeachie and Kulik, (1975); Block and Burns, (1976), indicates that students who learn in an environment that allows for testing, diagnosis, continued learning, and retesting exhibit greater content learning than do students involved in a more traditional learning environment. In their review of the mastery learning literature, Block and Burns (1976) reported that in 97 comparisons of average achievement test scores, comparisons involving various types and numbers of students and various subject matter areas, mastery taught students scored higher than nonmastery taught students 89% of the time, and significantly higher 61% of the time. Several studies have been conducted abroad to find out the effectiveness of Mastery Learning strategy related to different curricula area for different grades (Kim Hogwon et al. (1969 ), Kersh (1970). A conclusion coming out of these studies conducted abroad revealed in Bloom (1976) indicates that it is possible to improve mastery level of pupils in different subject areas through the strategy of Mastery Learning approach. However, study of trend report and abstracts available in Buch (1974, 1979) reveals that no such study has been conducted in India.



It is, therefore, considered worth while to initiate studies with a view to investigate into the effectiveness of Mastery Learning strategy in improving achievement of pupils in different curricula areas. The present study is an attempt in this direction.

#### 1.5.0 STATEMENT OF THE PROBLEM:

The problem reads as "Effect of Mastery Learning Strategy (MLS) on Pupil Achievement."

It is evident from the title that the method of teaching "Mastery Learning Strategy" versus conventional method of teaching Mathematics constitutes the independent variable. Mathematics subject has been selected for the reason that achievement of pupils in this area in India has been found to be much lower than that of other countries (Husson, 1967). Two independent variables of self concept and attitude towards mathematics have been selected from the affective domain because the level of achievement has been found to be related to these (Bloom, 1971). The independent variable of creativity was also taken to study, the effect of mastery learning strategy in mathematics, upon it.

#### 1.5.1 OBJECTIVES :

The study envisaged the following specific objectives:



- i. To study the pupil's achievement in mathematics adjusted on intelligence, socio-economic-status, and pre-achievement in mathematics, taught through mastery learning strategy and conventional method.
- ii. To study the effectiveness of MLS and the conventional teaching method in relation to pupil achievement in mathematics.
- iii. To study the effect of MLS on self-concept of pupils.
- iv. To study the change in attitude of pupils towards mathematics due to MLS.
- v. To study the effect of MLS on various dimensions of nonverbal creativity of pupils, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity.
- vi. To study the effect of MLS on different dimensions of verbal creativity of pupils, namely, fluency, flexibility, originality and composite creativity.

#### 1.5.2. HYPOTHESES:

In order to realize the objectives of the study operationalized above, the following hypotheses were formulated for testing:

H<sub>1</sub> : The pupils who are taught mathematics through mastery learning strategy (MLS) tend to show significantly higher achievement than their



counterparts who are taught mathematics through conventional method.

H<sub>2</sub>: The group of pupils taught mathematics through mastery learning strategy show significantly higher gains in the achievement than the group of pupils taught mathematics through conventional method.

H<sub>3</sub>: The self-concept of pupils show significant improvement after learning mathematics through MLS than their counterparts who learn mathematics through conventional method.

H<sub>4</sub>: The attitude of pupils show significant improvement after learning mathematics through MLS than their counterparts who learn mathematics through conventional method.

H<sub>5</sub>: The different dimensions of nonverbal creativity of pupils, namely, fluency, flexibility, originality, elaboration and composite score in non-verbal creativity show significant improvement after learning through mastery learning than their counterparts learning through conventional methods.

H<sub>6</sub>: The different dimensions of verbal creativity of pupils namely, fluency, flexibility, originality and composite creativity show significant improvement after learning through mastery learning than their counterparts learning mathematics through conventional method.





1.5.3. LIMITATIONS:

The study was conducted in the subject of mathematics, and only eight units were selected. The study was conducted for VI grade students studying in a Boys Govt. Middle School. Both the experimental and control groups were taught by the same teacher. So, the findings may be viewed against this background.



C H A P T E R - II  
DESIGN AND PROCEDURE

2.0.0 DESIGN

In the present study pre-test Post-test control group design was employed. It involved two groups of students, one experimental and the other control group. The pupil's achievement, self-concept, attitude towards mathematics and verbal and nonverbal creativity were the criterion verbales. The study was carried on in three stages. First stage involved testing of pupil achievement in mathematics their intelligence, socio-economic status, attitude towards mathematics, and verbal and nonverbal creativity in both the groups (pre-test stage). The second stage was the treatment stage of six months (including holidays). Teaching of mathematics through mastery learning strategy was the experimental treatment, therefore, eight units from VI class syllabus were selected for this purpose. Third stage was the stage of Post-testing. After completion of the experimental treatment, the achievement of pupils in mathematics, their self-concept, attitude towards mathematics verbal and nonverbal creativity were tested. The design of the study is presented in the table 2.1.



TABLE 2.1.     DESIGN OF THE STUDY

Stage	<u>T R E A T M E N T S</u>	
	EXPERIMENTAL GROUP	CONTROL GROUP
1. Pre-testing	Measurement of Pupil's 1. Intelligence 2. Socio-economic status 3. Attitude towards Mathematics 4. Self-concept. 5. Verbal creativity 6. Nonverbal creativity 7. Achievement in Mathematics	Measurement of Pupil's 1. Intelligence 2. Socio-economic status 3. Attitude towards Mathematics. 4. Self-concept 5. verbal creativity 6. Nonverbal creativity. 7. Achievement in Mathematics
2. Treatment	Teaching Mathematics through mastery learning strategy	Teaching mathematics through conventional method.
3. Post-testing	Measurement of Pupil's 1. Achievement in Mathematics 2. Self-concept. 3. Attitude towards mathematics 4. Verbal creativity 5. Nonverbal creativity	Measurement of Pupil's 1. Achievement in Mathematics 2. Self-concept. 3. Attitude towards mathematics 4. Verbal creativity 5. Nonverbal creativity



The independent variable, dependent variables and the control variables, with the kind of control employed in the study have been summarised in the Table -2.2

TABLE-2.2

VARIABLES

Independent variable	Dependent variables	Variable control	Control employed
method of teaching. (Mastery Learning Strategy and Conventional method)	1. Achievement	1. Grade to be taught	1. Administrative (Only VI grade. to be taught)
	2. Self-concept	2. Subject to be taught	2. Administrative (mathematics to be taught).
	3. Attitude towards Mathematics.	3. Single school	3. Administrative (to control institutional variations)
	4. Verbal creativity	4. Hellow effect	4. Administrative (ignorance about the experiment)
	5. Nonverbal creativity	5. pupil's intelligence	5. Statistical (Analysis of Co-variance)
		6. Pupil's Socio-economic status	6. Statistical (Analysis of Covariance.)

2.1.3 SAMPLE :

The sample consisted of 55 pupils studying in two sections of the VI class of the Middle school





No. 29, of Indore city. The age of the pupils ranged from 11 to 13 years, and they belonged to below average socio-economic strata of the society.

#### 2.2.0 TOOLS :

The following tools were used for the study :

1. Cattell's Culture Fair Test of Mental abilities to measure intelligence of pupils
2. Kuppuswamy's Socio-economic status scale to measure SES of pupils.
3. Attitude test for measuring attitude towards mathematics.
4. Sherry et al. test was used for measuring self-concept of pupils.
5. Figural form A and B of the Torrance Tests of Creative Thinking (TTCT) were used to measure non-verbal creativity of the pupils.
6. Passi's test of creativity was used to measure the verbal creativity of the pupils.
7. Achievement test developed by the investigator was used for measuring the achievement of pupils in mathematics.

#### 2.3.0 EXPERIMENTAL PROCEDURE :

##### 2.3.1. STAGE-I

- (i) The teacher involved in the experiment was trained in using mastery learning strategy. For this, four meetings were held with the teacher.



(ii) Pre-testing :

The following tests were administered in their respective order in both the experimental and the control groups :

1. Intelligence test
- b. Socio-economic status scale
- c. Self-concept test
- d. Test measuring attitude of pupils towards mathematics.
- e. Verbal test of creativity.
- f. Nonverbal test of creativity.
- g. Summative Achievement test.

2.3.2. STATE, II

Experimental Treatment :

After administration of the tests, teaching of mathematics through the mastery learning was the experimental treatment, therefore, eight units from the text book of mathematics prescribed by the Madhya Pradesh Textbook Corporation for class VI were selected for the purpose. These units were :

- (i) Fundamental operations over algebraic terms, such as, addition and subtraction; (ii) multiplication of algebraic terms, namely, commutative law of multiplication, associate law of multiplication, and distribution law; and power of an algebraic term; (iii) algebraic expression,



such as, use of brackets and simplification of an expression by removing brackets; (iv) parameter of a square, triangle, and rectangle; (v) area of a rectangle, a right angled triangle, and any triangle; (vi) Circle, Circumference, relation between diameter and circumference, and area of a circle (vii) volume, volume of a cubical solid, volume of a cube, and capacity of a vessel; and (viii) to find the average of given numbers.

A school period of thirty minutes duration was utilized for teaching mathematics. The criteria for mastery learning was 80% of mastery over each unit. The time for completing various units varied from 8 to 17 school periods. The same eight units were taught to the control group by the same teacher utilizing the same amount of time, by following conventional method of teaching. The experimental group took more time than the control group to complete the units, as the students have to attain the mastery level of the content, but the students of the control group utilized the remaining time on supervised self study. The mastery learning strategy comprised the following steps:

Step-I Development of Teaching Units and Unit tests

After deciding the content, it was divided into eight convenient teaching units. Unit tests were also developed



alongwith the teaching units. These tests were of diagnostic in nature and were the main source of feedback to both teacher and pupils. Each unit test was prepared and discussed with the teacher. These tests were administered after completion of each teaching units.

Step-II Orienting for Mastery:

Since the students were not accustomed to learning for mastery, the teacher must orient them to procedures to be used, and to what they have to learn; how they are expected to learn it; and what level of mastery they have to attain. It was made clear to the pupils that they have to attain 80% mastery level in each unit.

Step-III Teaching Unit:

A unit is taught to the class as a whole with maximum learning to maximum number of students, in a usual way.

Step-IV Formative Evaluation :

Unit formative tests were administered to the entire experimental group after completion of each unit. The teacher after scoring the unit test identified the students who have achieved mastery level in group (M) and such students who scored 60% and above on the unit test were grouped as ( $M_1$ ) and students who scored 50% and above were





grouped as ( $M_2$ ) and students who scored less than 50% were grouped as ( $M_3$ ).

Step-V      Making Renewed Efforts :

Through modified teaching approach, renewed efforts of teaching were made for students in groups ( $M_1$ ), ( $M_2$ ) and ( $M_3$ ). The students in group ( $M_1$ ) were guided to repeat their learning of the unit in the light of error(s) committed by them. The students in group ( $M$ ) were engaged in enrichment activities for group ( $M_2$ ). The students of group ( $M_2$ ) were divided into Tollies. Each Tolli generally has two students from group ( $M_2$ ) and one student from group ( $M$ ). The student from group ( $M$ ) was provided with, the type of errors committed by the students of group ( $M_2$ ) of his Tolli and verbal guidance by the teacher for removing these errors. The teacher reteach the whole unit to group ( $M_3$ ) Keeping in view the type of errors committed by them.

Step-VI-      Re-evaluating:

Students of groups  $M_1$ ,  $M_2$  and  $M_3$  were re-evaluated and students achieving the decided level of mastery joined group ( $M$ ). The remaining students who failed to achieve mastery level were again classified into ( $M_1$ ), ( $M_2$ ), and ( $M_3$ ) as in step-IV and treatment repeated as in step-V.



Step-VII Organising Tutorial Services:

The students who failed to achieve the decided level of learning after re-evaluation were provided with tutorial services by the teacher and selected students from group (II) as per need. Student's individual difficulties were searched out and solved accordingly, till they achieve the mastery level on the unit.

Step-VIII Teaching the next unit :

The teacher repeats this cycle of step-IV to VII till the mastery level of learning was achieved for the unit. Similarly all the units were completed, unit by unit.

2.3.3. STAGE-III

Post testing:

This was the stage of Post-testing. After completion of all the eight units by both the experimental and control groups, the following tests were administered in both the groups.

- a. Summative Achievement test.
- b. Self- concept test.
- c. Test measuring attitude of pupils towards mathematics.
- d. Verbal test of creativity.
- e. Nonverbal test of creativity.



2.4.0 Statistical Analysis

In order to fulfil the objectives of the study the following techniques were employed.

1. Analysis of Covariance for adjusting pupil's achievement in mathematics on intelligence, socio-economic-status and pre-test scores of pupils.
- ii. For testing the significance of difference between the means of pupil's self-concept, attitude towards mathematics, verbal creativity and nonverbal creativity, 't' test was used on pre-test, post-test and gain scores.



CHAPTER-III

RESULTS, INTERPRETATION AND DISCUSSION

1.0.0 INTRODUCTION

This chapter includes the results related to the six objectives, namely, (1) to find out the relative effectiveness of MLS and the conventional method, in relation to pupil's achievement in mathematics; (2) to find out the pupil's achievement in mathematics adjusted on intelligence, socio-economic status, and pre-achievement in mathematics, taught through mastery learning strategy and conventional method; (3) to find out the effect of MLS on self-concept of pupils; (4) to find out the change in attitude of pupils towards mathematics due to MLS; (5) to find out the effect of MLS on various dimensions of nonverbal creativity of pupils, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity; (6) to find out the effect of MLS on different dimensions of verbal creativity of pupils, namely, fluency, flexibility, originality and composite creativity. The interpretation of the results related to all the six objectives of the study and their discussion have been included in this chapter.





### 3.1.0 EFFECT OF MLS ON ACHIEVEMENT OF PUPILS

The first objective of the present study was to find out the effect of MLS on pupils' achievement in mathematics. The data related to this objective were analysed by employing t-test. The results are given in Tables 3.1 a and 3.1 b.

TABLE 3.1 a

DIFFERENCES IN PRE-TEST, POSTTEST MEAN SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON ACHIEVEMENT IN MATHEMATICS

Stage	Treatment	N	M	SD	't' value	Level of significance
Pre-test	Experimental	30	2.86	3.10	0.27	NS
	Control	25	3.12	3.87		
Posttest	Experimental	30	31.90	9.40	4.28	0.01
	Control	25	23.20	4.21		

NS = Not significant



TABLE 3.1 b

DIFFERENCE IN THE MEAN GAINS OF THE STUDENTS  
OF EXPERIMENTAL AND CONTROL GROUPS ON  
ACHIEVEMENT IN MATHEMATICS

Treatment	N	M	SD	't' value	Level of significance
Experimental	30	29.03	8.43	4.48	0.01
Control	25	20.08	5.85		

It may be observed from table 3.1 a that the 't' value of 0.27 for the difference in the mean scores, at the pre-test stage, of the students of experimental and control groups on achievement in mathematics, is insignificant at 0.05 level, with df 53. The mean score of 3.12 of the students of control group is higher than that of the experimental group mean score of 2.86, at the pre-test stage. Further, from table 3.1 b, one may observe that the 't' value of 4.28 for the difference in the mean scores, at the post-test stage, of students of experimental and control groups on achievement in mathematics, is significant at 0.01 level, with df 53. The mean score of 31.90 of the students of experimental group is significantly higher than that of the control group mean score of 23.20.



This shows that achievement in mathematics of the students of experimental group is higher than that of the control group after the treatment.

From table 3.1 b, one may observe that the t-value of 4.48 for df 53, for the difference in the mean gains of the students of experimental and control groups, is significant at 0.01 level. Since the mean gain score of the students of experimental group is higher than that of the control group on achievement in mathematics, it shows that the students of the experimental group have scored significantly higher than that of the control group, which ultimately may be attributed to the treatment. Such a state of affairs ultimately reflects upon the effectiveness of mastery learning strategy in the improvement of achievement of students in mathematics.

### 3.2.10 EFFECT OF MLS ON PUPIL'S ACHIEVEMENT IN MATHEMATICS ADJUSTED ON INTELLIGENCE, SOCIO-ECONOMIC STATUS, AND PRE-ACHIEVEMENT IN MATHEMATICS

The second objective of the present investigation was to find out the effect of MLS on pupil's achievement in mathematics adjusted on intelligence, socio-economic status, and pre-achievement in mathematics. The data related to this objective were analysed by employing analysis of covariance. The criterion variable was the posttest achievement scores in mathematics and controls were the intelligence test scores, socio-economic status scores and pre-test achievement test scores. The ANCOVA results are given in Tables 3.2 a and 3.2 b.



1

**THE UNIVERSITY OF CHICAGO**





TABLE 3.2 .b

SUMMARY OF ANCOVA FOR THE ACHIEVEMENT IN MATHEMATICS  
SCORES BETWEEN EXPERIMENTAL AND CONTROL GROUPS,  
CONTROLLING FOR PRIOR MATHEMATICS ACHIEVEMENT, INTELL-  
IGENCE AND SOCIO-ECONOMIC STATUS

Source of Variation	Degrees of Freedom (df)	Residuals		F	Level of significance
		Sum of squares (SS)	Mean square (MS)		
Between	1	1216.67	1216.67	28.54	0.01
Within	50	2131.48	42.63	-	-
Total	51	3348.15	-	-	-

From table 3.2 b, one can observe that the F-value of 28.54 for df 1/50 for the experimental and control groups, is significant at 0.01 level. It shows that there is a significant difference between the mean achievement scores of experimental and control groups. This means that having statistically adjusted for initial differences in intelligence, socio-economic status, and pre-test achievement scores between students who were taught mathematics through mastery learning strategy and



conventional method, there is a significant difference between the two groups. Hence, the mean score of 31.90 of the students of experimental group is significantly higher than that of the control group mean score of 23.20 (vide table 3.2 a). In other words, the achievement in mathematics of the students of experimental group is higher than that of the control group, after the treatment. In the present study, the students of the experimental group were taught eight units of mathematics through the strategy of mastery learning, whereas, the same units were taught to the students of control group by following the conventional teaching method. Such a state of affairs ultimately reflects upon the effectiveness of MLS in the improvement of achievement of students in mathematics.

The findings of the present investigation, i.e., the mastery learning strategy effects the achievement of students in mathematics seem to be quite interesting. The experimental and control groups are very different in terms of mean levels of achievement in mathematics after the treatment. The differences in their <sup>achievement may be explained in</sup> ~~their~~ terms of experimental group being given a higher quality of instruction than the control group, largely in terms of group instruction plus feedback and individualized instruction for the experimental group while only group instruction was provided to the control group by following the conventional method of teaching. Bloom (1976) has



observed that mastery learning research and practice has already amply demonstrated that the large majority of students in a class can learn selected subjects upto as high a level as the most able students in the group.

Usually, there has been some extra expenditure of time and help in achieving such results. Hence, the results of the present study that there is significant improvement in achievement by the strategy of mastery learning, thus seem to be justified.

### 3.3.0 EFFECT OF MLS ON SELF-CONCEPT OF PUPILS

The third objective of the present study was to find out the effect of MLS on pupil's self-concept. The data related to this objective were analysed by employing t-test. The results are given in Tables 3.3 a and 3.3. b



TABLE 3.3 a

DIFFERENCES IN PRE-TEST, POSTTEST MEAN SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON SELF-CONCEPT

Stage	Treatment	N	M	SD	't' value	Level of Significance
Pre-test	Experimental	30	28.5	4.74	1.30	NS
	Control	25	30.68	7.58		
Posttest	Experimental	30	31.36	5.37	0.39	NS
	Control	25	32.00	6.67		

NS = Not significant.





TABLE 3.3 b

DISTRIBUTION OF THE MEAN GAINS OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON SELF-CONCEPT

Treatment	N	M	SD	't' value	Level of significance
Experimental	30	2.87	5.13	0.99	NS
Control	25	1.32	6.43		

It may be observed from tables 3.3 a and 3.3 b that the 't' values of 1.30, 0.39 and 0.99 for the differences in the mean scores at the pre-test, post-test stage and mean gains respectively of the students of experimental and control groups on self-concept, are not significant at 0.05 level, with df 53. The mean scores (30.68, 32.00) of the students of control group are higher than that of the experimental group (28.50, 31.36) on self-concept at pre-stage as well as post-stage. But, the mean gain score of the students of experimental group is higher than that of the control group on self-concept, the 't' value could not reach the level of significance (vide table 3.3 b). This shows that although the self-concept of student's has been effected by the strategy of



mastery learning, but not significantly. It was also observed by Block (1971) that successful experiences in school are no guarantee of a generally positive self-concept, but they increase the probability that such will be the case. In contrast, unsuccessful experiences in school guarantee that the individual will develop a negative self-concept and increase the probability that they will have a generally negative self-concept. In the present study, there were relatively small differences between the experimental and control students on the measures of self-concept. It should be remembered that a short term study of several weeks of learning would be likely to have profound consequences on the student's affective characteristics (Bloom, 1976). A long term experimental study may prove helpful in drawing conclusions in this respect.

#### 3.4.0 EFFECT OF MLS ON ATTITUDE OF PUPILS TOWARDS MATHEMATICS

The fourth objective of the present study was to find out the effect of MLS on attitude of students towards mathematics. The data related to this objective were analysed by employing t-test. The results are given in Tables 3.4 a and 3.4 b.



TABLE 3.4 a

DIFFERENCES IN PRE-TEST, POSTTEST MEAN SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON ATTITUDE TOWARDS MATHEMATICS

Stage	Treatment	N	M	SD	't' value	Level of significance
Pre-test	Experimental	30	60.33	14.96	2.59	0.05
	Control	25	69.16	8.94		
Post-test	Experimental	30	69.27	10.95	1.93	NS
	Control	25	74.92	10.70		

TABLE 3.4 b

DIFFERENCE IN THE MEAN GAINS OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON ATTITUDE TOWARDS MATHEMATICS

Treatment	N	M	SD	't' value	Level of significance
Experimental	30	3.93	11.89	1.13	NS
Control	25	5.76	8.09		



It may be observed from table 3.4 a that the 't' value of 2.59 for the difference in the mean scores, at the pre-test stage, of the students of experimental and control groups on attitude towards mathematics is significant at 0.05 level, with df 53. The mean score of 69.16 of the students of control group is significantly higher than that of experimental group mean score of 60.33, at the pre-test stage. This shows that attitude of students of control groups towards mathematics was higher than that of the experimental group before the treatment. It may also be observed from table 3.4 a that the 't' value of 1.93 for the difference in the mean scores, at the posttest stage, of students of experimental and control groups on attitude towards mathematics, is insignificant at 0.05 level, with df 53. Further, it may be observed from table 3.4 b that the 't' value of 1.13 for the difference in the mean gains of the students of experimental and control groups, is insignificant at 0.05 level, but the mean gain score of 8.93 of experimental group is higher than that of the mean gain score of 5.76 of the control group. This shows that attitude towards mathematics of students of experimental group became higher than that of the control group, after the treatment. This indicates that although the attitude of students towards mathematics has been effected by the strategy of mastery learning, but not





significantly. It was also observed by Bloom (1976) that once an interest or attitude has been developed towards a subject, it is resistant to change. It should be remembered that a short term study of several weeks of learning would be likely to have profound consequences on the students affective characteristics (Bloom, 1976). A long term experimental study may prove helpful in drawing conclusions in this respect.

#### .0 EFFECT OF MLS ON VARIOUS DIMENSIONS OF NONVERBAL CREATIVITY OF PUPILS

The fifth objective of the present study was to find out the effect of MLS on various dimensions of nonverbal creativity of pupils, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity. The data related to this objective were analysed by employing t-test. The results are given in Tables 3.5 a, 3.5 b, and 3.5 c.



TABLE 3.5 a

DIFFERENCES IN THE PRE-TEST MEAN SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON DIFFERENT DIMENSIONS OF NONVERBAL CREATIVITY.

Dimensions of Creativity	Treatment	N	M	SD	't' value	Level of signifi- cance
Fluency	Experimental	30	5.57	5.27	2.60	0.05
	Control	25	10.12	7.68		
Flexibility	Experimental	30	4.73	4.25	2.37	0.05
	Control	25	7.64	4.85		
Originality	Experimental	30	9.20	9.13	1.95	NS
	Control	25	13.80	8.20		
Elaboration	Experimental	30	8.80	9.77	1.35	NS
	Control	25	12.24	9.02		
Total Nonverbal Creativity	Experimental	30	28.30	27.12	2.14	0.05
	Control	25	43.80	26.25		



TABLE 3.5 b

DIFFERENCES IN THE POSTTEST MEAN SCORES OF THE STUDENTS  
OF EXPERIMENTAL AND CONTROL GROUP ON DIFFERENT DIMENSIONS  
OF NONVERBAL CREATIVITY

Dimensions of Creativity	Treatment	N	M	SD	't' value	Level of signi- ficance
Fluency	Experimental	30	28.83	9.76	5.44	0.01
	Control	25	14.20	10.16		
Flexibility	Experimental	30	15.37	5.35	5.04	0.01
	Control	25	8.64	4.37		
Originality	Experimental	30	25.50	10.46	3.35	0.01
	Control	25	15.60	11.40		
Elaboration	Experimental	30	24.63	11.41	3.58	0.01
	Control	25	13.86	10.71		
Total Nonverbal Creativity	Experimental	30	96.00	33.69	4.81	0.01
	Control	25	52.32	33.29		



TABLE 3.5 c

DIFFERENCES IN THE MEAN GAINS OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON DIFFERENT DIMENSIONS OF NONVERBAL

CREATIVITY						
Dimensions of creativity	Treatment	N	M	SD	't' value	Level of Significance
Fluency	Experimental	30	23.27	8.53		
					6.88	0.01
	Control	25	4.10	11.57		
Flexibility	Experimental	30	10.63	5.76		
					6.24	0.01
	Control	25	1.00	5.66		
Originality	Experimental	30	16.30	12.33		
					4.61	0.01
	Control	25	1.80	10.98		
Elaboration	Experimental	30	15.83	9.33		
					4.68	0.01
	Control	25	1.64	12.55		
Total Non verbal Creativity	Experimental	30	67.70	33.95		
					6.33	0.01
	Control	25	8.52	34.97		





On viewing table 3.5 a, it may be observed that the values of 't' for the differences in the mean scores, at the pre-test stage, of the students of experimental and control groups in different dimensions of nonverbal creativity, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity are 2.60, 2.37, 1.95, 1.35, and 2.14, respectively. The t-values for fluency, flexibility and total score in nonverbal creativity are significant at 0.05 level, with df 53. Since, the mean scores of the students of control group are higher than that of the experimental group in all the dimensions of nonverbal creativity, it shows that the students of the control group have scored higher in different dimensions than that of the experimental group, at the pre-test stage.

It may be observed from table 3.5 b, that the values of 't' for the differences in the posttest mean scores of the students of experimental and control groups on different dimensions of nonverbal creativity, namely, fluency, flexibility, originality, elaboration and total score in nonverbal creativity are 5.44, 5.04, 3.35, 3.58, and 4.81, respectively. All of these 't' values are significant at 0.01 level, with df 53. This shows that there has been a significant difference in the posttest mean scores of the students of experimental



and control groups. Since, the mean posttest scores of the students of experimental group are significantly higher than that of the control group (vide table 3.5 b), it shows that the students of the experimental group have scored significantly higher than the students of control group in fluency, flexibility, originality, elaboration, and total score in nonverbal creativity, which ultimately reflects the effectiveness of the treatment, i.e.; teaching mathematics through mastery learning.

From table 3.5 c, one can observe that the values of 't' for the differences in the mean gains of the students of experimental and control groups in different dimensions of nonverbal creativity, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity are 6.88, 6.24, 4.61, 4.68, and 6.33, respectively. All of these t-values are significant at 0.01 level, with df 53. Since, the mean gain scores of the students of experimental group are higher than that of the control group in all the dimensions of nonverbal creativity, it shows that the students of experimental group have scored significantly higher than that of the control group, which ultimately may be attributed to treatment. In the present study, the students of the experimental group were taught eight units of mathematics



through the strategy of mastery learning, whereas, the same units were taught to the students of control group by following the conventional method. Such a state of affairs ultimately reflects upon the effectiveness of mastery learning strategy in the development of different dimensions of student's nonverbal creativity.

### 3.6.0 EFFECT OF MLS ON VARIOUS DIMENSIONS OF VERBAL CREATIVITY OF PUPILS

The sixth objective of the present investigation was to find out the effect of MLS on various dimensions of verbal creativity of pupils, namely, fluency, flexibility, originality, and composite creativity. The data related to this objective were analysed by employing t-test. The results are given in Tables 3.6 a and 3.6 b.



TABLE 3.6 a

DIFFERENCES IN THE PRE-TEST MEAN SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUPS ON DIFFERENT DIMENSIONS OF VERBAL CREATIVITY.

Dimensions of Creativity	Treatment	N	M	SD	't' value	Level of Significance
Fluency	Experimental	30	20.77	8.94	1.63	NS
	Control	25	17.96	11.41		
Flexibility	Experimental	30	2.43	1.45	1.26	NS
	Control	25	1.52	1.29		
Originality	Experimental	30	7.53	5.35	1.45	NS
	Control	25	4.68	4.44		
Composite Creativity	Experimental	30	30.73	13.12	1.27	NS
	Control	25	24.16	14.80		





DIFFERENCES IN THE POSTTEST MEAN SCORES OF THE STUDENTS  
OF EXPERIMENTAL AND CONTROL GROUPS ON DIFFERENT DIMENSIONS  
OF VERBAL CREATIVITY

Dimensions of Creativity	Treatment	N	M	SD	't' value	Level of signifi- cance
Fluency	Experimental	30	44.76	17.69		
					2.20	0.05
	Control	25	34.52			
Flexibility	Experimental	30	3.27	1.31		
					2.00	0.05
	Control	25	2.32	2.15		
Originality	Experimental	30	15.10	10.87		
					2.43	0.05
	Control	25	8.86	9.39		
Composite Creativity	Experimental	30	63.13	27.63		
					2.28	0.05
	Control	25	45.20	30.58		



It may be observed from table 3.6 a that the 't' values for the differences in the mean scores, at the pre-test stage, of the students of experimental and control groups in different dimensions of verbal creativity, namely, fluency, flexibility, originality, and composite creativity are 1.63, 1.26, 1.45, and 1.27, respectively. All of these t-values are insignificant at 0.05 level, with df 53. This shows that there is no significant difference in the mean scores of students of experimental and control groups in all the dimensions of verbal creativity, at the pre-test stage.

From table 3.6 b, one may observe that the value of 't' for the differences in the posttest mean scores of the students of experimental and control groups on different dimensions of verbal creativity, namely, fluency, flexibility, originality and composite creativity are 2.20, 2.00, 2.43, and 2.28, respectively. All of these t-values are significant at 0.05 level. This shows that there has been a significant difference in the posttest mean scores of the students of experimental and control groups. Since the mean posttest scores of the students of experimental group are significantly higher than that of the control group (vide table 3.6 b), it shows that the students of the experimental group have scored significantly higher than the students of



control group in fluency, flexibility, originality, and composite creativity dimensions of verbal creativity, which ultimately reflects the effectiveness of the treatment, i.e.; teaching through mastery learning. In this study, the students of the experimental group were taught eight units of mathematics, by following the mastery learning strategy, whereas, the students of the control group were taught the same units through the conventional teaching strategy. Hence, the strategy of mastery learning improved the verbal creativity scores of the students.

The findings of the present study, i.e. the improvement in student's creativity through the strategy of mastery learning seem to be quite interesting. So far mastery learning has been found to be effective in developing the cognitive and affective domains of student's abilities. Block (1971) has given the reference of forty studies carried out on school children which show that mastery learning had marked effect on student's cognitive and affective development and their learning rate. This is because that mastery learning methods produce markedly greater interest and develop favourable attitudes towards the materials learnt, than more conventional approaches. The feelings of defeatism and passivism brought to the learning are overcome by them to a great extent. The powerful and effective consequences of the strategies of



mastery learning may be attributed to many factors, the most important of which seem to be the cooperative rather than the competitive learning conditions, successful and rewarding learning experiences, personalized attention to each student's learning problems, and the use of certain correctives which add a personal-social aspect to the learning, which is not typical of group based instruction. The results thus seem to be reasonable. Creativity, which involves the higher level of mental processes and the highest level of abilities involved in the cognitive domain of students, is better facilitated when the cognitive, social, and emotional aspects of teaching or training are given due consideration (Torrance, 1972). Furthermore, creativity is a production of understanding and imagination (Parnes, 1967,). The units of mathematics covered in the present study involved the abilities pertaining to imagination (geometrical problems) to a great extent, which were brought to the higher level of cognition through the strategy of mastery learning. Proper understanding of the content and stretching of imagination to the level of mastery might have ultimately resulted into the student's increased scores on different dimensions of verbal creativity. The results of the present study, that the different dimensions of student's verbal creativity are significantly improved by the strategy of mastery learning, thus seem to be justified.

1



## CHAPTER - IV

### CONCLUSIONS AND IMPLICATIONS

#### 4.0.0 INTRODUCTION

On the basis of the results and their discussion given in Chapter III, the following conclusions are drawn. These conclusions are generalizable to the extent of the representativeness of the sample and methodology employed in the study. The conclusions and implications are presented here in accordance with the objectives.

#### 4.1.0 CONCLUSIONS

- (i) The group of pupils taught mathematics through Mastery learning strategy have shown significantly higher gain in the achievement than the group of pupils taught mathematics through conventional method.
- (ii) The posttest achievement mean scores between the experimental and control groups, controlling for prior mathematics achievement, intelligence, and socio-economic status, differ significantly. This implies that the students who were taught mathematics through mastery learning have shown



significant improvement in their achievement in mathematics than their counterparts who were taught mathematics through conventional method. Hence, mastery learning strategy helps in improving the achievement of pupils.

- (iii) The mean gain score of the students of experimental group was higher than that of the control group on self-concept, but the t-value could not reach the level of significance. This shows that although the self-concept of student's has been effected by the strategy of mastery learning, but not significantly. It should be remembered that a short term study of several weeks of learning would be likely to have profound consequences on the student's affective characteristics (Bloom, 1976). A long term experimental study may prove helpful in drawing conclusions in this respect.
- (iv) The mean score of the students of control group was significantly higher than that of the experimental group on attitude towards mathematics, at the pre-test stage. The mean gain score of the students of experimental group was higher than that of the control group on attitude towards



mathematics, but the  $t$ -value could not reach the level of significance. This shows that the attitude towards mathematics of the students taught through mastery learning strategy became higher than that of the control group, after the treatment. This indicates that although the attitude of students towards mathematics has been effected by the strategy of mastery learning, but not significantly. It was also observed by Bloom (1976) that once an interest or attitude has been developed towards a subject, it is resistant to change.

- (v) The different dimensions of nonverbal creativity of pupils, namely, fluency, flexibility, originality, elaboration, and total score in nonverbal creativity have shown significant improvement after learning mathematics through mastery learning strategy than their counterparts learning mathematics through conventional method.
- (vi) The different dimensions of verbal creativity of pupils, namely, fluency, flexibility, originality, and composite creativity have shown significant improvement after learning mathematics through the strategy of mastery learning than their counterparts learning mathematics through conventional method.



#### 4.2.0 EDUCATIONAL IMPLICATIONS

The main conclusions of the study have been presented in section 4.1.0. The educational implications of the conclusions are given below. The present study has several implications for teachers, teacher educators, administrators and for the research workers.

(i) The main finding of the present study shows that the students taught through mastery learning strategy achieve significantly higher than the students taught through conventional method. The major implication of this finding is that equality of learning outcomes can be a goal of education rather than equality of opportunity. Such a goal suggests that teachers must find ways of giving each child the help and encouragement he needs, when he needs it rather than ensuring identical treatment of all children. Inequality of treatment may be needed, at least at certain stages of the learning process, if students are to attain equality of learning outcomes. It means that the teachers and the instructional material and procedures should emphasize acceptable levels of learning for all children rather than be satisfied that each has been 'treated' fairly and equally. Mastery learning research and practice has already amply demonstrated that the large majority of students in a class can learn selected subjects up to as high a level





as the most able students in the group. Usually, there has been some extra expenditure of time and help in achieving such results. Mastery learning strategy holds out the possibility of such achievement being accomplished with an actual saving of student time over the entire course or program (Bloom, 1976). Hence, teachers should be trained to use MLS Model for teaching.

(ii) The formative evaluation in mastery learning strategy provides a system of feedback to the teacher and students in which errors in learning are revealed shortly after they occur, and if appropriate corrections are introduced as they are needed, the educational system can be a self-correcting system. Hence, the errors made at one time are corrected before they are compounded with later errors. Hence, teachers should be trained to use formative evaluation.

(iii) The mastery learning ideas and practices can be made use of in the Indian classroom. The mastery learning strategy is based on no technology except the technology of developing instructional materials (Textual, formative evaluation and summative evaluation) and indigenous organisational models for providing alternative instructional channels within our existing school and class structure. In this strategy, the teacher decides what goes on in the classroom and when a particular



activity will be taken in the classroom. The teacher is free to use his own instructional techniques and materials, which suit the need of his students. The student is also free to guide his learning and also helps others in learning. The group-based/teacher-paced mastery learning strategy, can be implemented with minor structural changes in our schools and classroom organisation.

(iv) The dropout rate at the primary level in India is staggering, despite the use of a number of measures in the form of incentives to the pupils. The dropout rate continues to be consistently high. The problem of dropout of children is likely to be tackled through ensuring quality of instruction and corresponding achievement on the part of the learner. Unless, it is ensured that each pupil in the beginning grade learns all the core concepts and skills of instruction in the area of literacy and numeracy, his subsequent learning potential will remain fragile. This situation makes it important for us in India to develop a strategy to ensure learning of the total instruction by all pupils. In other words, we need mastery learning strategy to be followed by the teachers of Indian schools. Research in this direction is highly desirable.

(v) One implication of mastery learning strategy is that talent can be developed. That is, if most students



can be brought to a high level in the learning of a particular set of subjects, skills, and abilities, then for most purposes this constitutes the development of talent, whether it be in science, mathematics, or any other field of human interest. Many characteristics or abilities that we have regarded as talents require long periods of development to bring to a high level. A society which needs a large number of people with particular talents cannot depend purely on selection methods for finding such talents. It must take the necessary steps to develop them relatively early and to educate for such talents in a systematic way over relatively long periods of time. The mastery learning strategy holds the promise that under appropriate conditions a sizeable proportion of a population can be brought to a high level of development in almost any major talent, ability, or quality desired in a society (Bloom, 1976). Hence, a long term experimental study may prove helpful in drawing conclusions in this respect.

(vi) The relatively high relation between cognitive behaviours and affective characteristics under most school conditions suggests that instruction must take these into consideration in determining what is necessary to develop both high cognitive learning outcomes as well as more positive affective characteristics. Favourable



school conditions can enable most students to learn well and to get satisfaction from their learning. The findings of the present study, that is, the mastery learning strategy improves the achievement of students in mathematics seem to be quite interesting. However, we would have expected similar relative improvement in affective changes for the experimental group but there were relatively small differences between the experimental and control students on the measures of affective characteristics. A long term study may prove helpful in drawing conclusions in this respect.

(vii) As pointed out earlier, mastery learning strategy has been found to be effective in improving students verbal as well as nonverbal creativity. So far, mastery learning has been found to be effective in developing the cognitive and affective domain of student's abilities. Thus, teachers should be trained by SCERT's, NCERT and other organisations in making use of mastery learning model in their classroom teaching.





## R E F E R E N C E S

- Asubal, D. The Psychology of Meaningful Learning, New York, Grame Straten, 1963.
- Bennet, N. Teaching Style and Pupil Progress, London, Open Books, 1978.
- Block, J.H. (Ed.) Mastery Learning: Theory and Practices, New York. Holt Rinchart and Winston, 1971.
- Block, J.H. Promoting Excellence Through Mastery Learning. Theory into Practice, Winter, 1980.
- Block, J.H. Mastery Learning in Classroom Instruction. New and Anderson, L.W., York: Macemilan, 1975.
- Block, J.H. (Ed.) Schools, Society, and Mastery Learning, New York: Holt Rinchart and Winston, 1974.
- Bloom, B.S. Learning for Mastery Chapter 3 in B.S. Bloom, J.T. Hesting and C.F. Madans, Handbook in Formative and Summative Evaluation of Student Learning, New York, McGraw Hill Book Company, 1971.
- Bloom, B.S. Human Characteristics and School Learning. New York, McGraw Hill Book Company, 1976.
- Buch, M.B. (Ed.) A Survey of Research in Education, Baroda, Centre of Advance Study in Education, M.S. University, 1974.
- Buch, M.B. (Ed.) Second Survey of Research in Education, Baroda, Society for Educational Research, 1979.



- Buch, M.B. (Ed.) Third Survey of Research in Education,  
Delhi, NCERT (under preparation).
- Chaudhary, S.P. Classroom Behaviour of Teachers and Pupils -  
A Study of Process - Process variables, International  
Journal of Education (in press).
- Carroll, J.B. A Model of School Learning, Teacher's College  
Record, 1963, 64, 723-733.
- Dave, P.N. Research on Teacher Effectiveness in India,  
Unpublished manuscript prepared for the International  
Development and Research Centre, Toronto, Canada.
- Gage, N.L. Handbook of Research on Teaching, Chicago, Rand Mc-  
Nally, 1963.
- Gage, N.L. The Science and Art of Teaching,  
New York, Teachers College Press, 1978.
- Gage, N.L.; et al. Educational Psychology, Chicago; Rand  
McNally, 1980.
- Hooda, R.C. Mastery Learning - The Basic Need of Indian Schools.  
Educational Forum, May, 1982.
- Jangira, N.K. Universal Learning Strategy, Primary Teacher,  
September, 1980.
- Jangira, N.K.; Singh, Ajit. Core Teaching Skills:  
Microteaching Approach, Delhi, NCERT, 1982 (b).
- Passi, B.K. Becoming Better Teachers: Microteaching Approach,  
Ahmedabad, Shitya Mudranalaya, 1976.



Popham, W.J. Educational Statistics. Harper and Row,  
Publishers, New York, 1967.

Rosenshine, B. Research on Teaching, International Journal  
of Education (in press).

Thorndike, R.L. Reading Comprehension Education in Fifteen  
Countries: International Studies in Evaluation, III,  
New York, John Wiley and Sons, Inc., 1973.

Travers, R.W.S. Essentials of Learning: An Overview to Student's  
of Education,  
New York, Macmillan, 1963.

Travers, R.W.S. Second Handbook of Research on Teaching.  
Chicago, Rand McNally, 1973.

Weil, Marsha; Joyce, Bruce. Information Processing Models of  
Teaching, New Jersey, Prentice Hall, Inc., Englewood  
Cliff, 1978.

Yadav, P.S. Effect of Mastery Learning Strategy on Pupil  
Achievement, Self Concept and their Attitude Towards  
Mathematics, Manuscript for Ph.D. Thesis to be sub-  
mitted to Kurukshetra University.



A P P E N D I X

EPIC PROJECT ON MASTERY LEARNING  
STRATEGY

DEPARTMENT OF EDUCATION  
DEVI AHILYA VISHWAVIDYALAYA  
INDORE





निष्पत्ति परीक्षण ॥ गणित ॥

कक्षा 6 टी

कुल अंक: 60

छात्र का नाम:

विद्यालय का नाम:

दिनांक:

वर्ग:

निर्देश:-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे लिखे निर्देशों को ध्यानपूर्वक पढ़िए :

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर दें हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए । कृपया प्रत्येक प्रश्न में एक ही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए ।
3. जिन प्रश्नों के आगे कोष्ठक ॥                      ॥ बने हैं, उनके उत्तर कोष्ठक ॥                      ॥ में लिखिए ।
4. रफ कार्य के लिए आप प्रश्नों के सामने बची खाली जगह का प्रयोग कर सकते हैं ।
5. कृपया प्रत्येक प्रश्न को सावधानीपूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

॥ 1 ॥ निम्न लिखित में से कौन सी संख्या बीजीय पद नहीं है ।

॥ अ ॥ 7 क

॥ ख ॥ क ख

॥ ग ॥ 3 क/2

॥ घ ॥ 7/2

॥ 2 ॥ निम्न लिखित को घटाकर उनके उत्तर सामने दिये हुए कोष्ठक में लिखो :-

॥ क ॥ 7 ख में से 10 क

॥ ख ॥ - 3 य<sup>2</sup> र में से -6 स<sup>2</sup> र

॥ ग ॥ -5 क ख में से 2 क ख

॥ 3 ॥ निम्न लिखित पदों को जोड़ो और उनके उत्तर सामने दिये हुये कोष्ठक में लिखो :

॥ क ॥ 5 ग में - 6 ग

॥ ख ॥ -7 क में 5 ख

॥ ग ॥ 14 क<sup>2</sup>ख में 3 क<sup>2</sup> ख

॥ 4 ॥ यदि क = 3 हो तो,

-क, -6क तथा -10 क, के योग का मान होगा :

॥ क ॥ 51

॥ ख ॥ -45

॥ ग ॥ -9

॥ घ ॥ -51

॥ 5 ॥ यदि क = 5 हो तो

4 क, -6क, के योग का मान होगा :

॥ क ॥ 10

॥ ख ॥ 20

॥ ग ॥ 20

॥ घ ॥ 30

॥ 6 ॥ निम्न लिखित पदों को गुणा करो और उत्तर उनके सामने दिये हुए कोष्ठकों में लिखो :

- ॥ क ॥  $3y^2$  र को  $-2y^2$  से ॥  
 ॥ ख ॥  $-7a^3$  च को  $-ab/7$  से ॥  
 ॥ ग ॥  $-10k^3$  जो  $3k^2$  ग से ॥

॥ 7 ॥ निम्न लिखित में, फिर पंक्ति के पदों का मान बराबर है ।

- ॥ क ॥  $-k^2$  और  $1-k^2$   
 ॥ ख ॥  $-k$  और  $1-k^3$   
 ॥ ग ॥  $-12k^4$  और  $1-2k^4$   
 ॥ घ ॥  $-16k^2$  और  $1-6k^2$

॥ 8 ॥ निम्न लिखित का मान निकालो और उत्तर उनके सामने दिये हुए कोष्ठकों में लिखो :

- ॥ क ॥  $1-2$  क ख<sup>4</sup> 3 का मान ॥  
 ॥ ख ॥  $1a^3$  ब<sup>2</sup> 4 का मान ॥  
 ॥ ग ॥  $1फ^6$  फ<sup>3</sup> 6 का मान ॥

॥ 9 ॥ एक से अधिक कोष्ठक होने पर निम्न लिखित में से सबसे पहले हटाया जाता है :

- ॥ क ॥ बड़ा कोष्ठक  
 ॥ ख ॥ छोटा कोष्ठक  
 ॥ ग ॥ धनु कोष्ठक  
 ॥ घ ॥ रेखा कोष्ठक

॥ 10 ॥ निम्न लिखित को सरल करो और उत्तर उनके सामने दिये हुए कोष्ठकों में लिखो :

- ॥ क ॥  $a - [b - \{c - d\}]$  ॥  
 ॥ ख ॥  $y - [y - \{y - (y - m - y)\}]$  ॥

- ॥ 11 ॥ एक वर्ग की लम्बाई 5 से.मी. है, उसका परिमाण होगा :
- ॥ क ॥ 25 से.मी.  
॥ ख ॥ 25 वर्ग से.मी.  
॥ ग ॥ 20 से.मी.  
॥ घ ॥ 10 से.मी.
- ॥ 12 ॥ एक आयत की लम्बाई 10 से.मी. और चौड़ाई 5 से.मी. है, उसका परिमाण होगा :
- ॥ क ॥ 15 से.मी.  
॥ ख ॥ 15 वर्ग से.मी.  
॥ ग ॥ 25 से.मी.  
॥ घ ॥ 30 से.मी.
- ॥ 13 ॥ एक त्रिभुज की तीन भुजाएं क्रमशः 6 से.मी., 5 से.मी. तथा 4 से.मी. हैं, त्रिभुज का परिमाण होगा :
- ॥ क ॥ 15 से.मी.  
॥ ख ॥ 15 वर्ग से.मी.  
॥ ग ॥ 30 से.मी.  
॥ घ ॥ 120 वर्ग से.मी.
- ॥ 14 ॥ एक वर्ग का परिमाण 24 से.मी. है, इसकी भुजा की लम्बाई होगी :
- ॥ क ॥ 12 से.मी.  
॥ ख ॥ 10 से.मी.  
॥ ग ॥ 8 से.मी.  
॥ घ ॥ 6 से.मी.
- ॥ 15 ॥ 50 मीटर परिमाण वाले आयताकार मैदान की लम्बाई 15 मीटर है, उसकी चौड़ाई होगी :

॥ क॥ 15 मी.

॥ ख॥ 10 मी.

॥ ग॥ 7.5 मी.

॥ घ॥ 5 मी.

॥ 16॥ आपके स्कूल की चारदिवारी की लम्बाई 35 मी. तथा चौड़ाई 15 मी. है। चार दिवारी पर 1/- रु., प्रतिमीटर वाले तार को लगवाने में कुल खर्च होगा :

॥ क॥ 50 रुपये

॥ ख॥ 65 रुपये

॥ ग॥ 80 रुपये

॥ घ॥ 100 रुपये

॥ 17॥ एक त्रिभुज का परिमाण 24 सें.मी. है। त्रिभुज की एक भुजा 7 सें.मी. और दूसरी भुजा 4 सें.मी. है, त्रिभुज की तीसरी भुजा की लम्बाई होगी :

॥ क॥ 9 सें.मी.

॥ ख॥ 11 सें.मी.

॥ ग॥ 13 सें.मी.

॥ घ॥ 17 सें.मी.

॥ 18॥ एक खेत का मैदान 150 मीटर लम्बा तथा 100 मीटर चौड़ा है। मैदान के तीन चक्कर लगाने में आपको चलना पड़ेगा :-

॥ क॥ 2.5 कि.मी.

॥ ख॥ 2.0 कि.मी.

॥ ग॥ 1.5 कि.मी.

॥ घ॥ 1.00 कि.मी.

- ॥ 19 ॥ 33 से.मी. परिमाण वाले त्रिभुज की एक भुजा 13 से.मी. है ।  
यदि बाकी दो भुजाएं आपस में बराबर हों, तो प्रत्येक की लम्बाई होगी :
- ॥ क ॥ 5 से.मी.
  - ॥ ख ॥ 6 से.मी.
  - ॥ ग ॥ 10 से.मी.
  - ॥ घ ॥ 13 से.मी.
- ॥ 20 ॥ 600 मीटर परिमाण वाले आयत की लम्बाई उसकी चौड़ाई की दुगुनी है । आयत की लम्बाई और चौड़ाई क्रमशः होगी :
- ॥ क ॥ 250 मीटर और 50 मीटर
  - ॥ ख ॥ 200 मीटर और 100 मीटर
  - ॥ ग ॥ 150 मीटर और 150 मीटर
  - ॥ घ ॥ 50 मीटर और 250 मीटर
- ॥ 21 ॥ 16 से.मी. परिमाण वाले आयत की लम्बाई, उसकी चौड़ाई से 4 से.मी. अधिक है । आयत की लम्बाई होगी :
- ॥ क ॥ 2 से.मी.
  - ॥ ख ॥ 4 से.मी.
  - ॥ ग ॥ 6 से.मी.
  - ॥ घ ॥ 8 से.मी.
- ॥ 22 ॥ 160 से.मी. लम्बी और 140 से.मी. चौड़ी पांच तस्वीरों के फ्रेम लगवाने पर 2.50 रुपये प्रति मीटर की दर से कुल व्यय होगा :
- ॥ क ॥ 60 रुपये
  - ॥ ख ॥ 65 रुपये
  - ॥ ग ॥ 70 रुपये
  - ॥ घ ॥ 75 रुपये

॥ 23 ॥ एक समान भुजाओं वाले त्रिभुजाकार खेत को तार के तीन चक्करों से घेरने पर 1350/- रुपये व्यय हुआ, यदि तार का भाव 1 रु. 50 पैसे प्रति मीटर हो तो त्रिभुज की एक भुजा की लम्बाई होगी ।

॥ अ ॥ 400 मीटर

॥ ब ॥ 300 मीटर

॥ स ॥ 200 मीटर

॥ द ॥ 100 मीटर

॥ 24 ॥ एक वर्गाकार पार्क की चारों ओर चारदीवारी पर सफेदी कराने का 20 पैसे प्रति मीटर की दर से 80 रुपये खर्च हुआ, पार्क की लम्बाई होगी :

॥ अ ॥ 50 मीटर

॥ ब ॥ 75 मीटर

॥ स ॥ 100 मीटर

॥ द ॥ 125 मीटर

॥ 25 ॥ कोई वस्तु अपनी सीमाओं के भीतर जितनी सतह या धरातल घेरती है, उसे वस्तु का :

॥ अ ॥ परिमाण कहते हैं

॥ ब ॥ परिधि कहते हैं

॥ स ॥ आयतन कहते हैं

॥ द ॥ क्षेत्रफल कहते हैं

॥ 26 ॥ 10 सें.मी. लम्बे और 6 सें.मी. चौड़े आयताकार मैदान का क्षेत्रफल होगा :

॥ अ ॥ 16 वर्ग सें.मी.

॥ ब ॥ 32 सें. मी.

॥ स ॥ 60 वर्ग सें.मी.

॥ द ॥ 60 सें. मीटर

- ॥ 27 ॥ 4 मीटर आधार तथा 50 से. मी. ऊंचाई वाले त्रिभुज का क्षेत्रफल :
- ॥ अ ॥ 1 वर्ग मीटर
- ॥ ब ॥ 2 वर्ग मीटर
- ॥ स ॥ 4 वर्ग मीटर
- ॥ द ॥ 8 वर्ग मीटर
- ॥ 28 ॥ 250 वर्गमीटर क्षेत्रफल वाले कमरे की लम्बाई 25 मीटर है, उसकी चौड़ाई होगी :
- ॥ अ ॥ 5 मीटर
- ॥ ब ॥ 10 मीटर
- ॥ स ॥ 15 मीटर
- ॥ द ॥ 20 मीटर
- ॥ 29 ॥ 625 वर्गमीटर क्षेत्रफल वाले वर्गाकार कमरे की भुजा की लम्बाई होगी:
- ॥ अ ॥ 40 मीटर
- ॥ ब ॥ 35 मीटर
- ॥ स ॥ 25 मीटर
- ॥ द ॥ 15 मीटर
- ॥ 30 ॥ 100 मीटर लम्बे तथा 50 मीटर चौड़े मैदान की घास कटवाने पर 100 रुपये प्रति हेक्टेयर की दर से कुल व्यय होगा :
- ॥ अ ॥ 500 रुपये
- ॥ ब ॥ 50 रुपये
- ॥ स ॥ 15 रुपये
- ॥ द ॥ 5 रुपये



॥ 31॥ 25 मीटर लम्बे तथा 20 मीटर चौड़े कमरे में 5 रुपये प्रति वर्ग मीटर के भाव से दरों विधाने पर व्यय होगा :

॥ अ॥ 3,000 रुपये

॥ ब॥ 2,500 रुपये

॥ स॥ 2,000 रुपये

॥ द॥ 1,500 रुपये

॥ 32॥ एक कमरे में लम्बाई 10 मीटर, चौड़ाई से दुगुनी है, 50 पैसे प्रति वर्ग मीटर का है। ता : लगाने पर 400 रुपये व्यय हुआ, हो तो कमरे की लम्बाई होगी :

॥ अ॥ 50 मीटर

॥ ब॥ 40 मीटर

॥ स॥ 30 मीटर

॥ द॥ 20 मीटर

॥ 33॥ 10 मीटर लम्बे तथा 4 मीटर चौड़े बरामदे को 50 सें. मी. चौड़ाई वाले टाट से ढकना है। इस कार्य के लिए टाट की लम्बाई होगी चाहिए।

॥ अ॥ 50 मीटर

॥ ब॥ 60 मीटर

॥ स॥ 70 मीटर

॥ द॥ 80 मीटर

॥ 34॥ 40 डेसीमीटर लम्बे तथा 20 डेसीमीटर चौड़े कमरे में फर्श पर 20 सें. मी. लम्बे तथा 10 सें. मी. चौड़े पत्थर लगवाने हैं। कुल कितने पत्थर लगेंगे।

॥ अ॥ 200

॥ ब॥ 300

॥ स॥ 400

॥ द॥ 500

॥ 35 ॥ 200 मीटर परिमाण वाले वर्गाकार कमरे का क्षेत्रफल होगा :

॥ अ ॥ 1000 वर्ग मीटर

॥ ब ॥ 1600 वर्ग मीटर

॥ स ॥ 2000 वर्ग मीटर

॥ द ॥ 2500 वर्ग मीटर

॥ 36 ॥ 1600 वर्ग मीटर क्षेत्रफल वाले वर्गाकार बाग का परिमाण होगा :

॥ अ ॥ 120 मीटर

॥ ब ॥ 140 मीटर

॥ स ॥ 160 मीटर

॥ द ॥ 180 मीटर

॥ 37 ॥ केन्द्र से निकलने वाली रेखा, जिसके सिरे वृत्त की परिधि पर होते हैं, उसे कहते हैं :

॥ अ ॥ परिधि

॥ ब ॥ चाप

॥ स ॥ त्रिज्या

॥ द ॥ व्यास

॥ 38 ॥ एक वृत्त की त्रिज्या "  $r$  " है, उसका क्षेत्रफल होगा :

॥ अ ॥  $\pi r$

॥ ब ॥  $2\pi r$

॥ स ॥  $\frac{1}{2} \pi r^2$

॥ द ॥  $\pi r^2$

॥ 39 ॥ एक वृत्त की त्रिज्या "  $x$  " है, वृत्त की परिधि होगी :

॥ अ ॥  $11x$

॥ ब ॥  $2\pi x$

॥ स ॥  $\pi x^2$

॥ द ॥  $1/2 \pi x^2$

॥ 40 ॥ 7 डेसीमीटर व्यास वाले साइकिल के पहिये को 440 मीटर की दूरी तय करने के लिये कितने चक्कर लगाने पड़ेंगे ।

॥ अ ॥ 100

॥ ब ॥ 150

॥ स ॥ 200

॥ द ॥ 220

॥ 41 ॥ 30 सें.मी. त्रिज्या वाले साइकिल का पहिया 10 चक्कर में कितनी दूरी तय करेगा :

॥ अ ॥ 18 मीटर

॥ ब ॥ 18.84 मीटर

॥ स ॥ 19 मीटर

॥ द ॥ 19.8 मीटर

॥ 42 ॥ 7 सें.मी. त्रिज्या वाला साइकिल का पहिया, 22 मीटर जाने में कितने पूरे चक्कर लगायेगा ।

॥ अ ॥ 25

॥ ब ॥ 50

॥ स ॥ 75

॥ द ॥ 100

॥ 43 ॥ 88 सें.मी. परिधि वाले वृत्त की त्रिज्या होगी :

॥ अ ॥ 7 सें.मी.

॥ ब ॥ 14 सें.मी.

॥ स ॥ 21 सें.मी.

॥ द ॥ 28 सें.मी.

॥ 44 ॥ 314 मीटर परिधि वाले वृत्ताकार मैदान का क्षेत्रफल होगा

(जबकि,  $\pi = 3.14$  हो) :

॥ अ ॥ 314 वर्ग मीटर

॥ ब ॥ 628 वर्ग मीटर

॥ स ॥ 3925 वर्ग मीटर

॥ द ॥ 7850 वर्ग मीटर

॥ 45 ॥ एक लड़का 70 मीटर व्यास वाले वृत्ताकार मैदान के चारों ओर दौड़ लगा रहा है, 2200 मीटर दौड़ने के लिए उसे कुल चक्कर लगाने पड़ेंगे :

॥ अ ॥ 10

॥ ब ॥ 9

॥ स ॥ 8

॥ द ॥ 6

॥ 46 ॥ एक कमरा 10 मीटर लम्बा, 6 मीटर चौड़ा तथा 8 मीटर ऊँचा है । उसके अन्दर आने वाली वायु का आयतन होगा :

- अ 480 घन मीटर  
 ब 480 घन मीटर  
 स 480 घन सें.मी.  
 द 48 घन लीटर

47 12 सें.मी. लम्बे तथा 8 सें.मी. आयताकार ठोस का आयतन 960 घन सें.मी. है। ठोस की ऊँचाई होगी :

- अ 8 सें.मी.  
 ब 9 सें.मी.  
 स 10 सें.मी.  
 द 11 सें.मी.

48 एक पेट्टी 50 सें.मी. लम्बी, 24 सें.मी. चौड़ी तथा 10 सें.मी. ऊँची है, उसमें 6 सें.मी. लम्बी, 4 सें.मी. चौड़ी तथा 2 सें.मी. मोटी ताकून की कितनी बट्टियाँ रखी जा सकेंगी ?

- अ 300  
 ब 250  
 स 200  
 द 150

49 9 मीटर लम्बी, 7 मीटर चौड़ी तथा 4 मीटर ऊँचे हाल में अधिक से अधिक कितने व्यक्ति बैठाये जा सकते हैं, जबकि एक व्यक्ति के लिए 4 घन मीटर जगह की आवश्यकता है :

- अ 42  
 ब 63  
 स 126  
 द 252

॥50॥ 12 सें. मी. के घन में से 3 सें. मी. के कुल कितने घन काटे जा सकते हैं ?

॥अ॥ 4

॥ब॥ 9

॥स॥ 16

॥द॥ 64

॥51॥ 1 मीटर लम्बी, 25 सें. मी. चौड़ी तथा 30 सें. मी. ऊँची पानी की टंकी में कितने किलोग्राम पानी आयेगा ।

॥अ॥ 75 किलोग्राम

॥ब॥ 100 किलोग्राम

॥स॥ 125 किलोग्राम

॥द॥ 150 किलोग्राम

निष्पत्ति परीक्षण : गणित यूनिट- 1

कक्षा 6टी

कुल अंक: 20

छात्र का नाम :

वर्ग:

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे लिखे निर्देशों को ध्यानपूर्वक पढ़िए:-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही  $\parallel$  का निशान लगाइए । कृपया प्रत्येक प्रश्न में एक ही उत्तर पर सही  $\parallel$  का निशान लगाइए ।
3. जिन प्रश्नों के आगे कोष्ठक  $\parallel$   $\parallel$  बने हैं, उनके उत्तर कोष्ठक  $\parallel$   $\parallel$  में लिखिए ।
4. रफ कार्य के लिए आप प्रश्नों के सामने बची खाली जगह का प्रयोग कर सकते हैं या पहले पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
5. कृपया प्रत्येक प्रश्न को सावधानीपूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

प्र. 1: निम्नलिखित पदों के संख्या गुणांक उनके सामने दिये कोष्ठक  $\parallel$   $\parallel$  में लिखो ।

क	107 लर	$\parallel$	$\parallel$
ख	$-15$ ज्य <sup>2</sup> 16	$\parallel$	$\parallel$
ग	य <sup>6</sup>	$\parallel$	$\parallel$
घ	- यल	$\parallel$	$\parallel$

प्र. 2: निम्नलिखित में पदों का योग उनके सामने दिये कोष्ठक में लिखी

- ॥ क॥ 7 प और 15 प ॥  
 ॥ ख॥  $3^2$  और 7  $3^2$  ॥  
 ॥ ग॥ च और 1 ॥

प्र. 3: निम्नलिखित में पहले लिखे गये पद में से दूसरे पद को घटाओ और उत्तर उसके सामने दिये गये कोष्ठक में लिखी ।

- ॥ क॥ 15 अ में से 8 अ ॥  
 ॥ ख॥  $16 क^2$  में से  $18 क^2$  ॥  
 ॥ ग॥ 7 क में से  $14 क^2$  ॥

प्र. 4: निम्नलिखित पदों को जोड़ो और उत्तर उसके सामने दिये गये कोष्ठक में लिखी :

- ॥ क॥ 6 अ, 7 अ, अ ॥  
 ॥ ख॥  $5 मन^3$ ,  $-12 मन^3$ ,  $6 मन^3$  ॥

प्र. 5: निम्नलिखित में पहले लिखे गये पद में से दूसरे पद को घटाओ और उत्तर उसके सामने के कोष्ठक में लिखी ।

- ॥ क॥ 15 प में से 6 प ॥  
 ॥ ख॥  $13 य^2$  में से  $18 य^2$  ॥  
 ॥ ग॥  $-7 य र^2$  में से  $-12 य र^2$  ॥

प्र. 6: निम्नलिखित को सरल करो और सामने वाले कोष्ठक में लिखी ।

- ॥ क॥  $7 अ - 12 अ - 6 अ + 4 अ$  ॥  
 ॥ ख॥  $-6 कग - 7 कग - कग - 8 कग$  ॥  
 ॥ ग॥  $16 य - 14य-य-5य$  ॥



प्र. 7: यदि  $k = 3$  हो तो,

-12 क, - 5 क तथा 4 क के योग का मान होगा :

अ) -63

ब) -51

ग) -39

घ) -36

प्र. 8: यदि  $k = 5$  हो तो,

11 क, - 6 क, 9 क, - 7 क तथा 5 क के योग का मान होगा :

अ) 55

ब) 50

ग) 45

घ) 40

प्र. 9: यदि  $k = 2$  हो तो,

7 क, 6 क, 4 क, - 10 क तथा 8 के योग का मान होगा :

अ) 20

ब) 22

ग) 24

घ) 26

निष्पत्ति परीक्षण गणित यूनिट-2

कक्षा 6 टी

कुल अंक: 20

छात्र का नाम :

वर्ग:

निर्देश:

प्रश्नपत्र आरम्भ करने से पूर्व नीचे लिखे निर्देशों को ध्यानपूर्वक पढ़िए:-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के हक़्तो अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही  $\parallel \checkmark \parallel$  का निशान लगाइए । कृपया एक ही उत्तर पर सही  $\parallel \checkmark \parallel$  का निशान लगाइए ।
3. जिन प्रश्नों के आगे कोष्ठक  $\parallel \quad \parallel$  बने हैं, उनके उत्तर कोष्ठक  $\parallel \quad \parallel$  में लिखिए ।
4. रफ़ कार्य के लिए आप पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
5. कृपया प्रत्येक/प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

प्र. 1: निम्नलिखित में पदों को गुणा करके उत्तर उसके सामने दिये कोष्ठक  $\parallel \quad \parallel$  में लिखो :

$\parallel \text{क} \parallel - 5y, - 9y^2 \parallel$

$\parallel \text{ख} \parallel 12a^2 \times 6a^4$

प्र. 2: निम्नलिखित में पदों को गुणा करो और उत्तर उसके सामने के कोष्ठक  $\parallel \quad \parallel$  में लिखो :

$\parallel \text{क} \parallel 3a \text{ व } 6 \text{ व } x \text{ से}$

1ख॥	- 60 घ को 8 क <sup>2</sup> घ <sup>4</sup> से	॥	॥
2ग॥	- 11 ग <sup>2</sup> र को -6 म <sup>2</sup> से	॥	॥
3घ॥	- 20 क <sup>2</sup> ख <sup>3</sup> को 2 क <sup>2</sup> ग <sup>2</sup> से	॥	॥
4ग॥	-12 न र <sup>3</sup> को न र से	॥	॥
5ख॥	5 घ <sup>3</sup> र <sup>2</sup> को 6 घ <sup>2</sup> र <sup>3</sup> से	॥	॥

प्र. 3: निम्नालिखित को सरल करो और उत्तर उनके सामने के कोष्ठक में लिखो :

क॥	5 ग <sup>2</sup> × 2 न × ग न	॥	॥
ख॥	6 क × क <sup>3</sup> × क <sup>4</sup>	॥	॥
ग॥	4 ग <sup>4</sup> × 2 र <sup>2</sup> × 2 घ	॥	॥
घ॥	3 ख × 6 ख × ख <sup>3</sup>	॥	॥
ङ॥	5 गख × 2 क × 3 ख <sup>2</sup>	॥	॥

निम्नालिखित को सरल करो और उत्तर उनके सामने के कोष्ठक में लिखो

क॥	॥6ख॥ ॥4ख॥	॥-2॥	॥	॥
ख॥	॥-5क॥	॥4क॥	॥-2क॥	॥
ग॥	॥-6क॥	॥44ख॥	॥6घ॥	॥
घ॥	॥2क॥	॥4ख॥	॥6क ख ग॥	॥
ङ॥	॥-3क॥	॥-2कख॥	॥4कखग॥	॥

प्र. 5: -6क × 5 ख × - 2 क ख का गुणनफल होगा :

क॥	60 क ख
ख॥	- 60 क ख
ग॥	- 60 क <sup>2</sup> ख <sup>2</sup>
घ॥	60 क <sup>2</sup> ख <sup>2</sup>

प्र. 6 :  $(9a) \times (-3b) \times (2a^2b)$  का गुणनफल होगा :

क  $- 54 a^2 b^2$

ख  $-54 a^2 b$

ग  $+ 54 a^3 b^2$

घ  $-54 a^3 b^2$

निष्पत्ति परीक्षण ॥ गणित ॥ यूनिट-3

कक्षा 6टी

कुल अंक: 20

छात्र का नाम :

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे लिखे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए । कृपया एक ही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए ।
3. जिन प्रश्नों के आगे कोष्ठक ॥    ॥ बने हैं, उनके उत्तर कोष्ठक ॥    ॥ में लिखिए ।
4. रफ कार्य के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
5. कृपया प्रत्येक प्रश्न को सावधानीपूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

॥ 1 ॥ निम्नलिखित में कौन से पदों का मान बराबर है :

॥ अ ॥  $-क^3$  और  $+ क^3$

॥ ब ॥  $-(2अ)^4$  और  $+ 16अ^4$

॥ स ॥  $-क^5$  और  $(-क)^5$

॥ द ॥  $क^3$  और  $(-क)^3$

॥ 2 ॥ निम्न लिखित को सरल करो और उत्तर सामने दिये ॥ कोष्ठक में लिखो :

- ॥ अ ॥  $(-ब^3स)^2$  ॥ ॥  
 ॥ ब ॥  $(-क^4)^2$  ॥ ॥  
 ॥ स ॥  $\frac{1}{4} (2य^4 र^2)$  ॥ ॥  
 ॥ द ॥  $(-3 क^2 ख^3)^2$  ॥ ॥

॥ 3 ॥ निम्न लिखित में कोष्ठकों को हटाकर सरल करो और उत्तर सामने वाले कोष्ठक में लिखो :

- ॥ अ ॥ क-  $(क+ख-ग)$  ॥ ॥  
 ॥ व ॥  $3क - (5क + 3ख - 2ग) + 3ख$  ॥ ॥  
 ॥ स ॥ क-  $(ख - ग - क)$  ॥ ॥  
 ॥ द ॥  $5क - (6 + 5क) + 6$  ॥ ॥

॥ 4 ॥ एक से अधिक कोष्ठक होने पर सबसे पहले हटाते हैं :

- ॥ क ॥ रेखा कोष्ठक  
 ॥ ख ॥ छोटा कोष्ठक  
 ॥ ग ॥ मझला कोष्ठक  
 ॥ घ ॥ बड़ा कोष्ठक

॥ 5 ॥ निम्न लिखित में कोष्ठकों को हटाकर सरल करो और उत्तर सामने वाले कोष्ठक में लिखें :

- ॥ क ॥  $य - (2य - र-ल) + य-र$  ॥ ॥  
 ॥ ख ॥  $7क - [(3क - 6ख - 4क)]$  ॥ ॥  
 ॥ ग ॥  $5 - 5 - 5 - 5 - 5$  ॥ ॥  
 ॥ घ ॥  $क - [2ख - \{3ग - (क-2ख - 3ग)\}]$  ॥ ॥

॥ 6 ॥ निम्नलिखित में कोष्ठकों को हटाकर सरल करो और सामने वाले कोष्ठक ॥ में लिखो :

॥ क ॥  $(अ - ब) - (ब - द) - (द - अ)$  ॥

॥ ख ॥  $(क + ग) - [(क - ग) - (क + ग)]$  ॥

॥ ग ॥  $3 - \{3क - (क + ख - 3)\}$  ॥

॥ 7 ॥ निम्नलिखित में कोष्ठकों को हटाकर सरल करो और उत्तर सामने वाले कोष्ठक ॥ में लिखो :

॥ क ॥  $अ - [3 व - \{3त - (अ - 3ब - 3से)\}]$  ॥

॥ ख ॥  $ग - [ग - \{ग (-ग - ग - 34)\}]$  ॥

॥ ग ॥  $3 - [3 - \{3 - (3 - 3)\}]$  ॥

निष्पत्ति परीक्षण ॥ गणित ॥ यूनिट-4

कक्षा : 6टी

कुल अंक: 15

छात्र का नाम:

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर दृष्टी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए । कृपया एक ही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए ।
3. रफ कार्य के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
4. कृपया प्रत्येक प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

॥ 1 ॥ वर्ग जिसकी भुजा की लम्बाई 9.5 से.मी. है, वर्ग का परिमाण होगा :

॥ क ॥ 19 से.मी.

॥ ख ॥ 28.5 से.मी.

॥ ग ॥ 36 से.मी.

॥ घ ॥ 38 से.मी.

॥ 2 ॥ एक आयताकार खेत की लम्बाई 20 मीटर तथा चौड़ाई 12 मीटर है, उसका परिमाण होगा :



132. 240 वर्ग मीटर

133. 32 मीटर

134. 8 मीटर

135. 64 मीटर

136. 64 मीटर गहराई वाले वर्ग की भुजा की लम्बाई होगी :

137. 30 मीटर

138. 15 मीटर

139. 10 मीटर

140. 5 मीटर

141. 100 मीटर लम्बे तथा 50 मीटर चौड़े मैदान के तीन चक्कर लगाने में खर्चा होगा :

142. 150 मीटर

143. 300 मीटर

144. 600 मीटर

145. 900 मीटर

146. एक 20 मीटर लम्बे तथा 110 मीटर चौड़े मैदान के चारों ओर तार लगाने का कुल खर्च 1 रु. प्रति मीटर के हिसाब से होगा :

147. 200 रु.

148. 300 रु.

149. 600 रु.

150. 700 रु.

151. एक 250 मीटर वर्गाकार लम्बे मैदान के चारों ओर 10 पैसे प्रति मीटर की दर से वा. लगवाने का कुल खर्च होगा :

152. 10 रु.

153. 50 रु.

154. 100 रु.

155. 1000 रु.

॥7॥ 5 से.मी., 6 से.मी. तथा 4.5 से.मी. भुजाओं वाले त्रिभुज का परिमाण होगा :

॥क॥ 15.5 से.मी.

॥ख॥ 31 से.मी.

॥ग॥ 62 से.मी.

॥घ॥ 93 से.मी.

॥8॥ 24.5 से.मी. परिमाण वाले त्रिभुज की दो भुजाएं 5 से.मी. तथा 4.5 से.मी. है, उसकी तीसरी भुजा होगी :

॥क॥ 5 से.मी.

॥ख॥ 9.5 से.मी.

॥ग॥ 10 से.मी.

॥घ॥ 15 से.मी.

॥9॥ एक समव्दिबाहु त्रिभुज का परिमाण 55 से.मी. है, यदि उसकी एक भुजा 15 से.मी. है । दोनों शेष भुजाएं बराबर हैं । प्रत्येक की लम्बाई होगी :

॥क॥ 5 से.मी.

॥ख॥ 10 से.मी.

॥ग॥ 20 से.मी.

॥घ॥ 30 से.मी.

॥10॥ एक त्रिभुजाकार खेत की सभी भुजाएं बराबर हैं उसकी एक भुजा 50 मीटर है । उसे नोटदार तार के चार चक्करों से घेरा गया है यदि एक मीटर तार 1 रु. 50 पैसे का मिलता हो, तो कुल व्यय होगा :

- 1. क. 150 रु.
- 2. ख. 450 रु.
- 3. ग. 600 रु.
- 4. घ. 900 रु.

111 एक आयत की लम्बाई उसकी चौड़ाई से दूनी है। उसकी परिमाप 150 मीटर है। आयत की लम्बाई होगी :

- 1. क. 15 मीटर
- 2. ख. 50 मीटर
- 3. ग. 100 मीटर
- 4. घ. 150 मीटर

112 एक आयत की लम्बाई उसकी चौड़ाई से 5 से.मी. अधिक है। उसकी परिमाप 50 से.मी. है। आयत की चौड़ाई होगी :

- 1. क. 5 से.मी.
- 2. ख. 10 से.मी.
- 3. ग. 15 से.मी.
- 4. घ. 25 से.मी.

113 एक त्रिभुजाकार खेत को तार से घेरा गया है। त्रिभुज की सभी भुजाएं समान हैं। 2 रु. प्रति मीटर के भाव का 900 रु. का तार लगा है। त्रिभुज की एक भुजा की लम्बाई होगी :

- 1. क. 450 मीटर
- 2. ख. 300 मीटर
- 3. ग. 200 मीटर
- 4. घ. 150 मीटर

॥१४॥ एक वर्गाकार मैदान के चारों ओर । रु. 50 पैसे प्रति मीटर वाला तार लगाने पर 450 रु. व्यय हुआ । मैदान की लम्बाई होगी :

॥क॥ 300 मीटर

॥ख॥ 200 मीटर

॥ग॥ 100 मीटर

॥घ॥ 75 मीटर ,

॥१५॥ एक तस्वीर 40 से.मी. लम्बी तथा 20 से.मी. चौड़ी है । इस प्रकार की 5 तस्वीरों में । रु. 50 पैसे प्रति मीटर की दर से फ्रेम लगवाने पर कुल व्यय होगा :

॥क॥ 3 रु.

॥ख॥ 6 रु.

॥ग॥ 9 रु.

॥घ॥ 12 रु.

निष्पत्ति परीक्षण : गणित : यूनिट 5

कक्षा 6 टी

कुल अंक: 10

छात्र का नाम :

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही '✓' का निशान लगाइए । कृपया एक ही उत्तर पर सही '✓' का निशान लगाइए ।
3. राफ कारी के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं
4. दिया प्रत्येक प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

11 6 मीटर लम्बाई वाले वर्ग का क्षेत्रफल होगा :

- 1 6 वर्ग मीटर
- 2 36 वर्ग से.मी.
- 3 36 वर्ग मीटर
- 4 36 वर्ग डेढ़ मीटर

12 120 मीटर लम्बे, 60 मीटर चौड़े आयताकार खेत का क्षेत्रफल होगा :

- 1 180 वर्ग मीटर
- 2 360 वर्ग मीटर

॥ग॥ 7200 वर्ग मीटर

॥घ॥ 3600 वर्ग मीटर

॥3॥ एक त्रिभुजाकार क्यारी का आधार 5 मीटर तथा ऊंचाई 80 से.मी. है । क्यारी खेत का स्थान धरेगी :

॥क॥ 1 वर्ग मीटर

॥ख॥ 2 वर्ग मीटर

॥ग॥ 3 वर्ग मीटर

॥घ॥ 4 वर्ग मीटर

॥4॥ एक वर्गाकार मेजपोश 49 वर्ग डेसीमीटर है । उसकी लम्बाई होगी :

॥क॥ 49 मीटर

॥ख॥ 49 डेसीमीटर

॥ग॥ 7 डेसीमीटर

॥घ॥ 7 मीटर

॥5॥ 7 मीटर लम्बे तथा 2 मीटर चौड़े कमरे में 2 रु. प्रति वर्ग मीटर वाली दरी बिछाने पर कुल खर्च होगा :

॥क॥ 14 रु.

॥ख॥ 28 रु.

॥ग॥ 18 रु.

॥घ॥ 24 रु.

॥6॥ 18 मीटर लम्बे तथा 4 मीटर चौड़े बरामदे को 72 से.मी. चौड़ी दरी से ढकना है । दरी की लम्बाई होगी :

- ॥ क ॥ 50 मीटर
- ॥ ख ॥ 100 मीटर
- ॥ ग ॥ 150 मीटर
- ॥ घ ॥ 200 मीटर

॥ 7 ॥ 90 डेसीमीटर लम्बे तथा 36 डेसीमीटर चौड़े कमरे में 20 से. मी. लम्बे तथा 5 से. मी. चौड़े पत्थर कुल लगेंगे :

- ॥ क ॥ 810
- ॥ ख ॥ 1620
- ॥ ग ॥ 2430
- ॥ घ ॥ 3240

॥ 8 ॥ एक वर्गाकार खेत जिसका क्षेत्रफल 100 वर्गमीटर है । इसका परिमाण होगा :

- ॥ क ॥ 100 मीटर
- ॥ ख ॥ 120 मीटर
- ॥ ग ॥ 140 मीटर
- ॥ घ ॥ 160 मीटर

॥ 9 ॥ 800 मीटर परिमाण वाले वर्गाकार खेत का क्षेत्रफल होगा :

- ॥ क ॥ 100 एअर
- ॥ ख ॥ 200 एअर
- ॥ ग ॥ 300 एअर
- ॥ घ ॥ 400 एअर

॥ 10 ॥ 1040 वर्गमीटर क्षेत्रफल वाले चौक की चौड़ाई 20 मीटर है । चौक की लम्बाई होगी :

- ॥ क ॥ 52 मीटर
- ॥ ख ॥ 26 मीटर
- ॥ ग ॥ 16 मीटर
- ॥ घ ॥ 13 मीटर

निष्पत्ति परीक्षण । गणित । यूनिट 6

कक्षा 6टी

कुल अंक : 10

छात्र का नाम :

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही । ✓ का निशान लगाइए । कृपया एक ही उत्तर पर सही । ✓ का निशान लगाइए ।
3. रफ कार्य के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
4. कृपया प्रत्येक प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दें ।

1. 28 से.मी. व्यास वाले चूत्त की परिधि की लंबाई होगी :  
।क। 22 से.मी.  
।ख। 44 से.मी.  
।ग। 66 से.मी.  
।घ। 88 से.मी.
2. 28 से.मी. त्रिज्या वाले चूत्त की परिधि की लंबाई होगी :  
।क। 44 से.मी.  
।ख। 88 से.मी.  
।ग। 132 से.मी.  
।घ। 176 से.मी.



3. 242 मीटर परिधि वाले वृत्त की त्रिज्या होगी :-  
॥क॥ 38.5 मीटर  
॥ख॥ 77 मीटर  
॥ग॥ 115.5 मीटर  
॥घ॥ 154 मीटर
4. 11 2 से.मी. व्यास वाले वृत्त का क्षेत्रफल होगा :  
॥क॥ 98.56 वर्ग से.मी.  
॥ख॥ 99.56 वर्ग से.मी.  
॥ग॥ 100.56 वर्ग से.मी.  
॥घ॥ 101.56 वर्ग से.मी.
5. 7 से.मी. त्रिज्या वाले वृत्त का क्षेत्रफल होगा :  
॥क॥ 22 वर्ग से.मी.  
॥ख॥ 77 वर्ग से.मी.  
॥ग॥ 88 वर्ग से.मी.  
॥घ॥ 154 वर्ग से.मी.
6. 314 मीटर परिधि वाले वृत्ताकार मैदान की त्रिज्या होगी :  
॥क॥ 10 मीटर  
॥ख॥ 20 मीटर  
॥ग॥ 30 मीटर  
॥घ॥ 50 मीटर
7. 70 मीटर व्यास वाले वृत्ताकार मैदान के चारों ओर 2200 मीटर की दौड़ लगाने के लिये कुल चक्कर लगाने होंगे :

॥ क॥ 5

॥ ख॥ 10

॥ ग॥ 15

॥ घ॥ 20

8. 14 से.मी. त्रिज्या वाले पहिये को 1320 से.मी. जाने के लिये कुल चक्कर लगाने होंगे :

॥ क॥ 5

॥ ख॥ 10

॥ ग॥ 15

॥ घ॥ 20

9. 12.56 मीटर परिधि वाले वृत्त का व्यास होगा :

॥ क॥ 4 मीटर

॥ ख॥ 8 मीटर

॥ ग॥ 12 मीटर

॥ घ॥ 16 मीटर

10. 6.28 मीटर परिधि वाले वृत्ताकार मैदान का क्षेत्रफल होगा :

॥ क॥ 3.14 मी वर्गमीटर

॥ ख॥ 6.28 वर्गमीटर

॥ ग॥ 9.42 वर्गमीटर

॥ घ॥ कोई जो आप को ठीक लगे ।

निष्पत्ति परीक्षण ॥ गणित ॥ युनिट 7

कक्षा 6 टी

कुल अंक: 10

छात्र का नाम :

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए । कृपया एक ही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए ।
3. रफ कार्य के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग क : सकते हैं ।
4. कृपया प्रत्येक प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

11 18 से.मी. लम्बे, 15 से.मी. चौड़े तथा 8 से.मी. ऊँचे डिब्बे का आयतन होगा :

- ॥क॥ 270 घन से.मी.
- ॥ख॥ 120 घन से.मी.
- ॥ग॥ 2060 घन से.मी.
- ॥घ॥ 2160 घन से.मी.

2॥ 6 से. मी. कोर वाले घन का आयतन होगा :

- ॥क॥ 36 घन से. मी.
- ॥ख॥ 216 घन से. मी.
- ॥ग॥ 432 घन से. मी.
- ॥घ॥ 512 घन से. मी.

3॥ 6 मीटर लम्बे, 4 मीटर चौड़े तथा 5 मीटर ऊँचे कमरे का आयतन होगा :

- ॥क॥ 20 घनमीटर
- ॥ख॥ 24 घनमीटर
- ॥ग॥ 30 घनमीटर
- ॥घ॥ 120 घनमीटर

4॥ 800 घन से. मी. वाले ठोस आयताकार डब्बे की लंबाई 20 से. मी. तथा चौड़ाई 10 से. मी. है, उसकी ऊँचाई होगी :

- ॥क॥ 4 से. मी.
- ॥ख॥ 6 से. मी.
- ॥ग॥ 8 से. मी.
- ॥घ॥ 10 से. मी.

5॥ 480 घनमीटर आयतन वाले कमरे की ऊँचाई 4 मीटर तथा चौड़ाई 10 मीटर है, उसकी लंबाई होगी :

- ॥क॥ 48 मीटर
- ॥ख॥ 24 मीटर
- ॥ग॥ 12 मीटर
- ॥घ॥ 6 मीटर

- 6॥ एक तालाब 6मीटर लम्बा तथा 5मीटर चौड़ा है और इसमें पानी भरा है । यदि इसमें 105 घनमीटर रेत डाल दिया जाये तो पानी का तल ऊपर उठ जायेगा :

॥क॥ 1मीटर

॥ख॥ 1.5 मीटर

॥ग॥ 3.5 मीटर

॥घ॥ 5.5 मीटर

- 7॥ 12 से.मी. के घन में से 3 से.मी. के घन काटे जा सकेंगे ।

॥क॥ 16

॥ख॥ 27

॥ग॥ 48

॥घ॥ 64

- 8॥ एक पेटी 20 से.मी. लंबी, 10 से.मी. चौड़ी तथा 6.से.मी. ऊंची है, इसमें 4 से. मी. लम्बी 3 से.मी. चौड़ी तथा 2 से.मी. मोटी डब्बियां रखी जा सकेंगी :-

॥क॥ 25

॥ख॥ 50

॥ग॥ 60

॥घ॥ 75

- 9॥ 10 मीटर लम्बे, 6 मीटर चौड़े, तथा 5 मीटर ऊँचे हाल में यदि एक व्यक्ति के लिए 5 घन मीटर हवा की आवश्यकता हो तो कुल व्यक्ति बैठाये जा सकेंगे :

क 60

ख 50

ग 30

घ 15

10 2 मीटर लम्बी, 50 से.मी. चौड़ी तथा 20 से.मी. ऊंची टंकी में कितने किलोग्राम दूध आयेगा ?

क 100 किलोग्राम

ख 150 किलोग्राम

ग 200 किलोग्राम

घ 250 किलोग्राम

निष्पत्ति परीक्षण ॥ गणित ॥ यूनिट 8

कक्षा 6 टी

कुल अंक: 10

छात्र का नाम :

वर्ग :

निर्देश :-

प्रश्नपत्र आरम्भ करने से पूर्व नीचे निर्देशों को ध्यान पूर्वक पढ़िए :-

1. सभी प्रश्नों के उत्तर इसी प्रश्नपत्र पर देने हैं ।
2. जिन प्रश्नों के एक से अधिक संभावित उत्तर दिए गए हैं, उनमें से सही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए । कृपया एक ही उत्तर पर सही ॥ ✓ ॥ का निशान लगाइए ।
3. रफ कार्य के लिए पहले तथा अंतिम पृष्ठ पर बची जगह का प्रयोग कर सकते हैं ।
4. कृपया प्रत्येक प्रश्न को सावधानी पूर्वक पढ़िए और निर्देशानुसार उनके उत्तर दीजिए ।

1. राग ने किसी परीक्षा में गणित में 80 अंक, हिन्दी में 44 अंक, सांताजिक अध्ययन में 48 अंक तथा विज्ञान में 64 अंक पाये । उसके अंकों की औसत होगी :

॥ क ॥ 58

॥ ख ॥ 59

॥ ग ॥ 64

॥ घ ॥ 69

2. क्रिकेट के एक खिलाड़ी ने 6 खेलों में क्रमशः 10, 0, 12, 6, 7 और 7 रन बनाये उसके रन बनाने का औसत होगा :

- ॥ क॥ 6
- ॥ ख॥ 7
- ॥ ग॥ 8
- ॥ घ॥ 10

3. एक गाड़ी 6 घंटे में कुल 396 किलोगीटर चली । इस गाड़ी की औसत चाल प्रति घंटा होगी :

- ॥ क॥ 60 कि. मी.
- ॥ ख॥ 62 कि. मी.
- ॥ ग॥ 64 कि. मी.
- ॥ घ॥ 66 कि. मी.

4. तीन गजदूरों ने औसत 6 रोटी खाई यदि दो ने औसत 3 रोटी खाई हों, तो तीसरे गजदूर ने रोटी खाई :-

- ॥ क॥ 3
- ॥ ख॥ 6
- ॥ ग॥ 12

5. क्रिकेट के खेल में 4 खिलाड़ियों के आउट होने तक रनों का औसत 15 था । पांचवें खिलाड़ी के आउट होने पर औसत 16 हो गया । पांचवें खिलाड़ी के रनों की संख्या होगी :

- ॥ क॥ 10
- ॥ ख॥ 15
- ॥ ग॥ 20
- ॥ घ॥ 30

6. सप्ताह के पहले 6 दिनों का औसत तापमान 15 से. ग्रे. हो और सप्ताह का औसत तापमान 14 से. ग्रे. हो, तो सातवें दिन का तापमान होगा :



क) 6° से. ग्रे.

ख) 8° से. ग्रे.

ग) 10° से. ग्रे.

घ) 14° से. ग्रे.

7. कक्षा के 30 छात्रों की औसत आयु 12 वर्ष है। एक नये छात्र के आने से यह औसत 12 वर्ष महिना हो गई। नये छात्र की आयु होगी:

क) 12 वर्ष

ख) 12 वर्ष 1 महिना

ग) 13 वर्ष 7 महिने

घ) 14 वर्ष 7 महिने

8. एक गाड़ी 4 घंटे में 280 किलोमीटर जाती है, उसकी औसत चाल प्रति घंटा होगी :

क) 60 कि. मी.

ख) 70 कि. मी.

ग) 80 कि. मी.

9. इन्दौर में सप्ताह के सात दिनों का टमाटर का भाव प्रति किलोग्राम इस प्रकार रहा : सोमवार 63 पैसे, मंगलवार 82 पैसे, बुधवार 69 पैसे, गुरुवार 75 पैसे, शुक्रवार 83 पैसे, शनिवार 69 पैसे, रविवार 77 पैसे। सप्ताह का औसत भाव होगा :

क) 70 पैसे

ख) 72 पैसे

ग) 74 पैसे

घ) 76 पैसे

10. किसी स्थान पर जून, जुलाई, और अगस्त की औसत वर्षा 30 से. मी. है। परन्तु जून, जुलाई, अगस्त और सितम्बर की औसत वर्षा 25 से. मी. है। सितम्बर मास में वर्षा हुई :

क) 5 से. मी.

ख) 10 से. मी.

ग) 15 से. मी.

घ) 20 से. मी.

छात्र गणित अभिवृत्ति मापनी

(STUDENT MATHEMATICS ATTITUDE SCALE)

R.C. Hooda & S.K. Sharma

शिक्षा विभाग

इन्दौर विश्व विद्यालय, इन्दौर

नाम ..... कक्षा .....

आयु ..... विद्यालय का नाम .....

निर्देश : प्रिय विद्यार्थियों,

इस प्रपत्र में गणित से सम्बन्धित कुछ कथन दिए गए हैं, जिसके बारे में हम आपको राय जानना चाहते हैं। किसी कथन से सम्बन्धित गतिविधि को आप हमेशा करते होंगे, किसी को अधिकतर, किसी गतिविधि को आप बहुत कम करते होंगे या यह भी हो सकता है कि किसी गतिविधि को आप कभी भी न करते हों।

कृपया प्रत्येक कथन को ध्यानपूर्वक पढ़िए और सोचिए कि आप इस कथन से सम्बन्धित गतिविधि को किस हद तक करते हैं या उसके बारे में क्या सोचते हैं। अपने उत्तरों को कथन के आगे लिखे चार विकल्पों में से एक पर सही  $\times$  /  $\checkmark$  का चिन्ह लगाइए।

हमेशा पर $\times$ चिन्ह लगाइए	हमेशा $\checkmark$	यदि आप गतिविधि को हमेशा करते हैं।
अधिकतर पर $\times$ चिन्ह लगाइए	अधिकतर $\checkmark$	यदि आप गतिविधि को अधिकतर करते हैं।
कभी-कभी पर $\times$ चिन्ह लगाइए	कभी कभी $\checkmark$	यदि आप गतिविधि को कभी-कभी करते हैं।
कभी नहीं पर $\times$ चिन्ह लगाइए	कभी नहीं $\checkmark$	यदि आप गतिविधि को कभी नहीं करते हैं।

कृपया प्रत्येक कथन के बारे में अपनी स्पष्ट राय दीजिए । ध्यान रखिए कि आपकी राय केवल शोधकार्य के लिए प्रयोग की जाएगी और पूर्णतया गोपनीय रखी जाएगी ।

कथन :-

1. गणित शिक्षक की हर बात में ध्यानपूर्वक हमेशा अधिकतर कभी कभी कभी नहीं सुनता हूँ ।
2. गणित की कोई बात जब मेरी समझ में नहीं आती तो मैं उनसे पूछ लेता हूँ ।
3. जब शिक्षक किसी सवाल को जल्दी-जल्दी करते हैं तो मैं उन्हें धीमा करने के लिए कहता हूँ ।
4. गणित की कक्षा में मैं आवाज उत्पन्न करता हूँ जैसे-कुर्सी हिलाकर, जूतों द्वारा ।
5. गणित की कक्षा में मैं दूसरे छात्रों पर चाक, पत्थर या कागज के टुकड़े फेंकता रहता हूँ ।
6. गणित की कक्षा में मुझे झपकियाँ आती हैं ।
7. गणित की कक्षा में बैठे बैठे मैं घर की परिस्थितियों के बारे में सोचता रहता हूँ ।
8. मैं सोचता हूँ कि गणित का पीरियड जल्दी खत्म हो जाए तो अच्छा रहे ।
9. मैं सोचता हूँ कि शिक्षक मुझसे अधिक से अधिक प्रश्न पूछें ।
10. मैं गणित शिक्षक से प्रश्न पूछता हूँ ।

11.	जब तक कोई बात मेरी समझ में पूरी तरह नहीं आ जाती मैं शिक्षक से पूछता रहता हूँ ।	हमेशा	अधिकतर	कभी-कभी	कभी नहीं
12.	कक्षा में कराए जाने वाले प्रश्नों को मैं पढ़ले हो करके देख लेता हूँ ।	--	--	--	--
13.	नया प्रश्न आरम्भ करने के पूर्व मैं पहले प्रश्नों की कठिनाइयों को शिक्षक से पूछ लेता हूँ ।	--	--	--	--
14.	मैं शिक्षक को परेशान करने के लिए ही प्रश्न पूछता हूँ ।	--	--	--	--
15.	गणित की कक्षा में मैं कहानियों की किताब पढ़ता हूँ ।	--	--	--	--
16.	गणित की कक्षा में मैं अन्य विषयों का कार्य करता हूँ ।	--	--	--	--
17.	गणित पढ़े लिए मनोरंजन का एक साधन है ।	--	--	--	--
18.	कक्षा के बाहर मैं अपने दोस्तों से गणित की चर्चा करता हूँ ।	--	--	--	--
19.	स्कूल में जब भी मुझे खाली समय मिलता है, मैं गणित के सवाल करता हूँ ।	--	--	--	--
20.	गणित के घंटे में जब शिक्षक खेलने के लिए भेज देते हैं तो मुझे बड़ा अच्छा लगता है ।--	--	--	--	--
21.	पुस्तकालय में जाकर मैं गणित की अधिक से अधिक पुस्तकें देखता हूँ ।	--	--	--	--
22.	गणित के शिक्षक जब छुट्टी पर होते हैं तब मुझे बड़ा अच्छा लगता है ।	--	--	--	--
23.	गणित का कोई प्रश्न जब मुझे नहीं आता तो मैं अपने माता-पिता, भाई-बहन या घर के अन्य सदस्यों से पूछ लेता हूँ ।	--	--	--	--

- |     |   |       |        |         |          |
|-----|---|-------|--------|---------|----------|
| 24. | गणित के प्रश्नों को मैं अपने आप ही करने की कोशिश करता हूँ ।               | हमेशा | अधिकतर | कभी-कभी | कभी नहीं |
| 25. | घर जाकर सबसे पहले मैं गणित का ही कार्य करता हूँ ।                         | --    | --     | --      | --       |
| 26. | गणित का कोई सवाल जब मुझे नहीं आता तो मैं उस सवाल को छोड़ देता हूँ ।       | --    | --     | --      | --       |
| 27. | गणित के कठिन से कठिन प्रश्न हल करने में मुझे आनन्द आता है ।               | --    | --     | --      | = --     |
| 28. | मैं घर पर नियमित रूप से गणित का कार्य करता हूँ ।                          | --    | --     | --      | --       |
| 29. | गणित के प्रश्न करने से मैं मानसिक थकान, सिर दर्द, सहस्र करता हूँ ।        | --    | --     | --      | --       |
| 30. | जब मेरे माता-पिता मुझे सवाल करने के लिए कहते हैं, मैं तभी सवाल करता हूँ । | --    | --     | --      | --       |
| 31. | स्कूल में दिए गए प्रश्नों को मैं कुंजी में देखकर कर लेता हूँ ।            | --    | --     | --      | --       |
| 32. | गणित का कार्य मैं अपने साथी की कापी से देखकर कर लेता हूँ ।                | --    | --     | --      | --       |
| 33. | गणित पढ़ने से आदमी मेहनती हो जाता है                                      | --    | --     | --      | --       |
| 34. | गणित की पढ़ाई से बुद्धि तेज होती है                                       | --    | --     | --      | --       |
| 35. | मैं सोचता हूँ कि गढ़ा लीकर मैं गणित के क्षेत्र में कार्य करूँगा ।         | --    | --     | --      | --       |
| 36. | गणित मानसिक विकास का एक रक्षक विषय है ।                                   | --    | --     | --      | --       |